SKYWAYS

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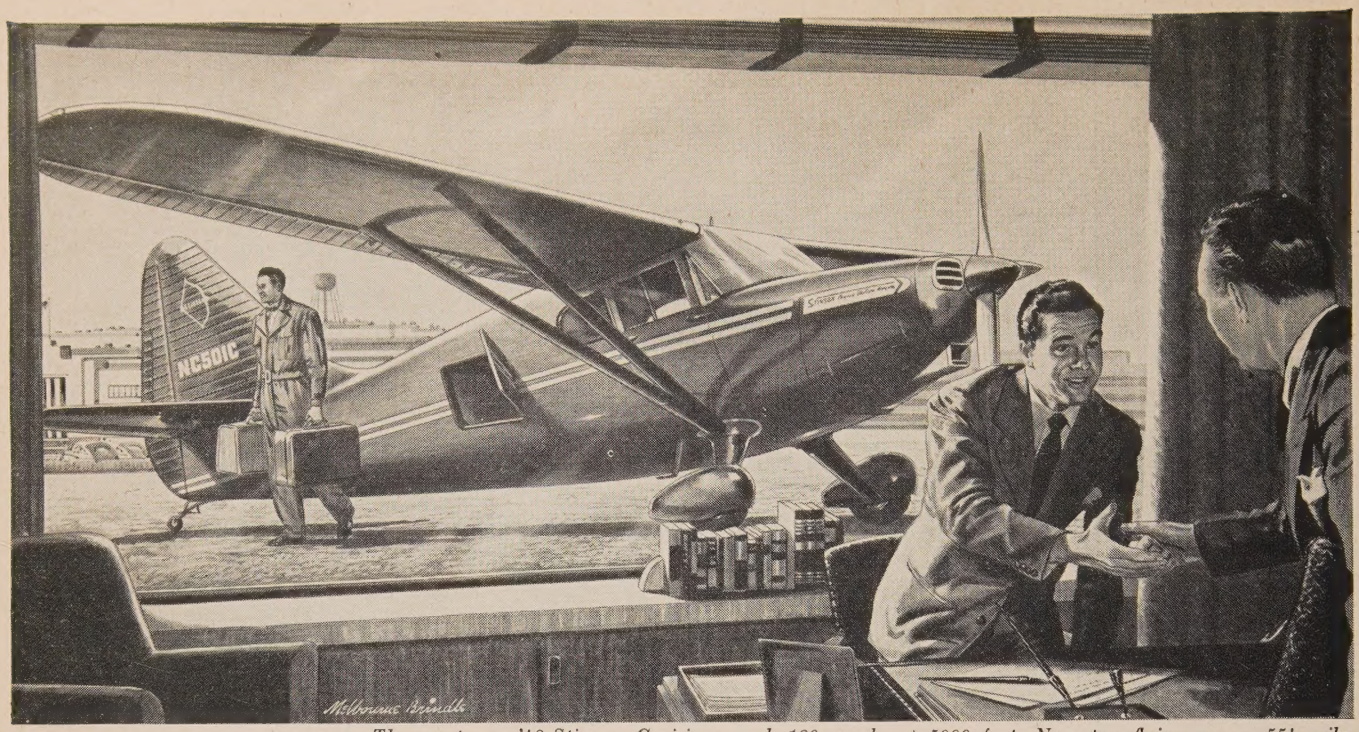

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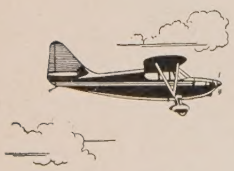

"Using my one Stinson convinced me we needed two"

Frank Querry, 44-year-old manufacturer of chain link fencing, bought a Stinson and learned to fly it for pleasure and relaxation. He soon discovered it had *business* value, too.

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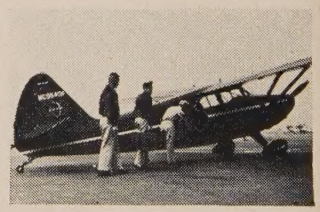

"I soon decided that a second Stinson, flown by my sales manager, would easily pay for itself. And it did—by saving time and transportation costs, and by expanding the territory we could serve."

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SKYWAYS

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D. N. AHNSTROM . . . Managing Editor
STANLEY M. COOK . . Production Manager
CHARLES W. ADAMS . . . . Art Director
E. E. SCHAFER . . . Circulation Manager
ALICE ROGERS HAGER Washington Corresp.

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Advertisement

AIRviews

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AIR YOUR VIEWS

Air Your Views

Champ Stunter
Gentlemen:

I've been wondering about something for a long time. Why don't they have a championship meet to find the champion stunt pilot in the U. S.? There are champions in all other sports . . . championship baseball teams, boxing champions, etc. In my opinion a contest to establish the champion in stunt flying would be very exciting. It would be a dangerous sport, but there are a lot of well-liked sports that are dangerous. Why is it they haven't got a champion stunt flyer?

G. E. DAVIS

Fort Worth, Texas.

There are many excellent aerobatic pilots in this country, and at some of the air shows trophies have been awarded the winners in such meets. We doubt, however, the necessity of picking a so-called champion. Most aviation enthusiasts believe flying has reached a point where such dare-devil and dangerous undertakings as establishing a champion in the field of aerobatics no longer proves anything. In the early days of automobiles, stunt drivers were many. Today there are only a few around the country. Flying is a means of transportation today, just as the auto is. And just as the top auto meet today is the famed Indianapolis race, the top air meet today is the National Air Race at Cleveland or the All-American Air Maneuvers held in Florida every year. Stunting is an art left to those professional stunt pilots who know their work well and therefore know when to stop tempting fate. All of those aerobatic pilots are good. Who of the group is the best is a matter of personal opinion. Off hand, we can't think of a sport that would involve the danger there is in stunt flying by other than professional stunt pilots, all of whom are champions.—ED.

•

Short on HP.

Gentlemen:

Let's give C. B. Colby a big hand on his "Short on HP . . . Long on Fun" article in the July issue. He is definitely right. I would like to see that article reprinted in all other aviation mags. I started on the home-built stuff in 1928, and have wondered since where the light stuff went to. It sems to me our muffler belts have been slipping.

HARVEY STONER

Bremerton, Washington.

•

Gentlemen:

"Short on HP . . . Long on Fun" in the July issue was an outstanding article and I thoroughly agree with Colby's opinions. As soon as I finished reading that article, I sat down to try my luck at designing a really small lightplane. After two hours, I came up with a sketch of a two-placer, side-by-side. There's nothing elaborate about it, probably would be fabric-covered, powered by 35 to 40-hp engine, and employ wheel control. If a plane of this size could be manufactured and sold in the $500 to $1,000 price bracket, many thousands of average Americans like myself could afford to buy and fly his own personal airplane.—ED.

Your editors agree that, to bring flying to the greatest number of Americans, a really lightplane that'll sell cheap is the answer. We've also been advised that there's a development or two in England that will fit this really lightplane category. One in particular is powered by 35-hp engine. With petrol (ahem) and pounds both on the low side in the U.K., there's reason there to design and build a small ship that will sell and operate for little. Perhaps it will start a new trend in this counry.—ED.

•

Queries

Gentlemen:

In the April issue you ran a picture of the *Monocoupe*. Could you give me the address of this company and some details of that ship? Can it be flown on floats?

STEVE BLACK

Coniston, Ontario, Canada.

For detailed specifications, we suggest you write to Monocoupe Airplane & Engine Co., at Melbourne, Florida. Nothing has been released by this company regarding float operations for the Monocoupe.—ED.

•

Gentlemen:

Have you had any articles on Airways Communications . . . and what about a few helpful hints about aircraft schools? It would be especially enjoyable and useful to us guys who are in the dark, and yet want to make the Air World our future, too.

WM. E. EDWARDS, USN
% FPO San Francisco, Calif.

Thank you for the suggestions, and we'll endeavor to provide that information in a subsequent issue.—ED.

•

Cessna

Gentlemen:

In the July issue you stated the Cessna 190 had a 200-hp engine. I thought it was powered by a 240-hp engine.

J. HERMAN

Bloomington, Ill.

Our apologies to Mr. Herman and other of our readers. The Cessna 190 is powered by 240-hp Continental engine. The Cessna 195 has a 300-hp Jacobs engine up in the nose. Both are five-place ships.—ED.

•

Midget Info

Gentlemen:

Can you give me any information on midget racing planes?

H. FOLKERS

Harrisburg, Pa.

Note Art Chester's article in this issue . . . page 32.—ED.

•

Hostessing

Gentlemen:

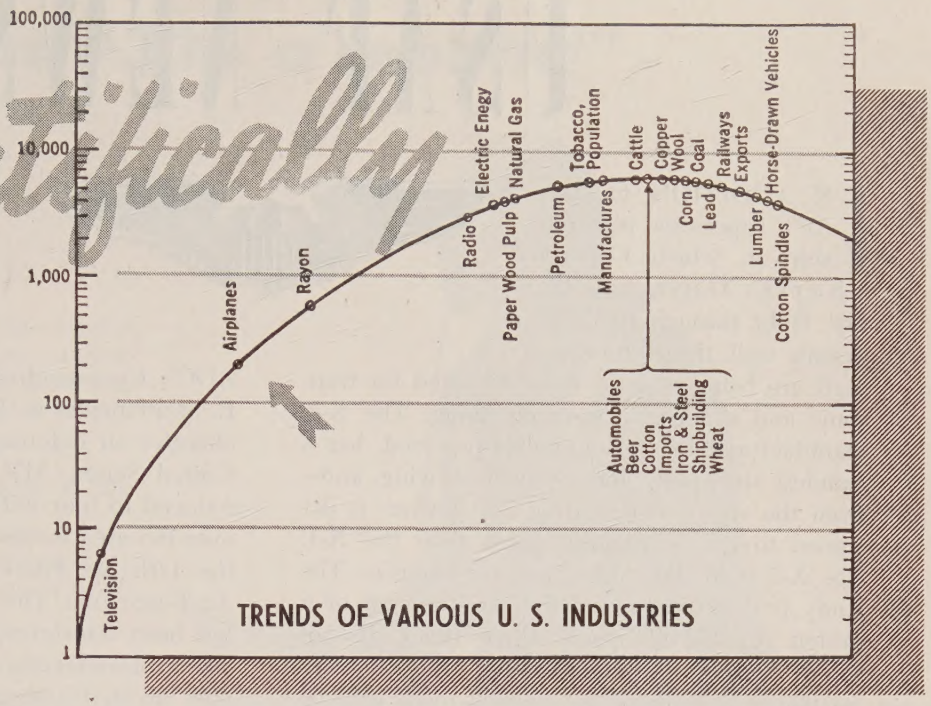
How can I get information regarding airline hostesses ?

C. McCORMICK

Ball, La.

Have you tried writing direct to the airlines? If they can't supply you with the information you want, try one of your local book stores. Quite a few books have been written on that subject.—ED.

HOW TO CHOOSE A CAREER Scientifically



In their famous book, "Cycles," Edward R. Dewey and Edwin F. Dakin (Henry Holt and Company, 1947) explain the "key to predicting what may come by examining what has been."

YOUR FUTURE IS TOO IMPORTANT TO MAKE A WRONG CHOICE. Study the chart above. Note the position of aviation. Is there any better way of getting into a new and uncrowded field than to choose a *growing industry?* Choose your career scientifically. Select an industry with a bright future. Then get the training to fit you for success on the job.

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USAF NEWS

IN ADDITION to X-1, AF'S supersonic research ship in which Captain Charles Yeager made his first flight through the supersonic wall, three other aircraft are being or have been designed for transonic and supersonic research flying. The X-2, manufactured by Bell, is rocket-powered, has a stainless steel body and swept-back wing, and—from the standpoint of drag and power—is designed to obtain higher speeds than the X-1. The X-3 is in the study stage by Douglas. The study is directed toward the development of a design capable of speeds three times that of sound with an altitude ceiling of 200,000 to 300,000 feet. To date, Douglas has made over 60 different design studies ranging from a stubby blunt-nosed model to one which features a long slender fuselage that comes to a sharp, bullet-like point fore and aft. Ram-jet, pulse-jet, and turbo-jet propulsion units—singly and in combination—have been studied as possible propellants. The only releasable information on the X-4 is that it is to be manufactured by Northrop.

RECRUITING and selection of enlisted women for the newly authorized WAF (Women in the Air Force) is expected to get underway this month. USAF plans to accept approximately 100 enlistments each month until the authorized strength of 4,000 enlisted women, 300 officers, and 40 warrant officers is reached. This strength ceiling will be in effect until July 1, 1950. After that, the size of the WAF has been authorized not to exceed two percent of the authorized over-all strength of the Air Force. Air WACS on duty with USAF in June totalled 2,106, of whom 173 were officers and 12 warrant officers.

To qualify for enlistment in the WAF, women must be unmarried U. S. citizens between 18 and 35; women under the age of 20 must have parental consent, and women over 35 with prior military service will be accepted if their prior service equals or exceeds the number of years they are past 35. Women without prior service must be high-school graduates and will be given 11 weeks of basic training at an Air Force Base in the San Antonio, Texas, area.

Newly appointed head of the WAF is Colonel Geraldine P. May, a native of Albany, New York, and graduate of the University of California.

THE Air Defense Command, responsible for the air defense of the United States, has been reorganized. Primary objective of the reorganization according to ADC's Commanding General, Lt. Gen. George E. Stratemeyer, is the establishment of the most effective air defense possible for the continental United States. ADC's six air forces have been reduced to four with the First Air Force taking over the area formerly covered by the 11th, and the 14th Air Force taking over the old Tenth Air Force area. The Tenth Air Force designation has been transferred to the 2nd Air Force area. The 2nd and 11th no longer exist. The U. S. is now divided among the four air forces for air defense responsibilities as follows:

First Air Force: Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Pennsylvania, Ohio, Indiana, Maryland, West Virginia, Virginia, Kentucky, and the District of Columbia. *Fourth Air Force*: Washington, Oregon, California, Nevada, Montana, Idaho, Utah, and Arizona. *Tenth Air Force*: Wyoming, Colorado, North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa, Missouri, Wisconsin, Illinois, and Michigan. *Fourteenth Air Force*: Tennessee, North Carolina, Mississippi, Alabama, Georgia, South Carolina, Florida, Arkansas, Louisiana, Oklahoma, New Mexico, and Texas.

A DISTINCTIVE shoulder patch for MATS is in the mill. The design incorporates a globe to indicate its sphere of operations and the three arrows from the Seal of the Secretary of National Defense are featured at the center of USAF wings. It is expected that MATS aircraft will carry this marking. . . . A contract for nearly three million dollars has been awarded to Fairchild Aircraft for the construction of 23 additional sets of the new track-type landing gear. Eighteen C-82 *Packets* will be equipped with complete tricycle installations of the new gear. . . . Lt. General Lewis H. Brereton, former Senior AF Member of the Military Liaison Committee to the Atomic Energy Commission, has been appointed Secretary General of the Air Board. He replaces Major General Hugh J. Knerr who was named USAF Inspector General. . . . USAF'S F-87, has been named *Blackhawk*.

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- close contact with the latest developments in aviation including new planes, improved equipment, the last word in electronics, jet propulsion, remote control flying,
- a chance to apply for advanced courses at any of a number of service schools and — if you earn a regular commission — to attend a leading civilian university,
- to top it all off, up to $336 a month pay—*more than $4000 a year!"*

These can be all yours, too, if you can qualify for Aviation Cadet pilot training and can complete successfully the 52-week training course. To be eligible, you must be unmarried, between 20 and 26½ years old, and have at least half the credits necessary for a college degree (or pass an equivalent examination).

Visit your nearest Air Force Base or attend the special events in your community on Air Force Day. Talk to the Air Force personnel you meet there. Make an appointment to take your examinations for Aviation Cadet training.

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NAVAL AVIATION

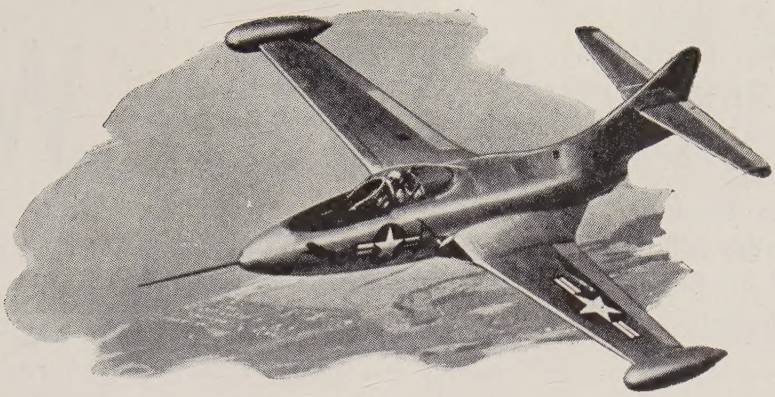
WHILE aerodynamicists and test pilots were knocking on the sonic wall in their attempts to fly as fast as the speed of sound, a Navy scientist was quietly concerned with an invention which makes the speed of sound look like it's standing still. Dr. A. M. Zarem of the Naval Ordnance Test Station, Inyokern, California, was catching up with the speed of light! His invention, an all electric camera, has been operated so fast that light travelling one thousand million feet per second moves a distance of only 10 feet during the time of one exposure. If moving pictures of a bullet leaving the muzzle of a gun were taken at the camera's rate of one hundred million frames per second and projected on a screen at the normal rate you are accustomed to seeing in the movies, it would take you six hours of watching to see the bullet travel 25 feet, the length of an ordinary living room. Remembering that a military aircraft is a fast moving raft whose mission is to carry and launch ordnance against an enemy, this camera at the Navy's Ordnance Test Station takes on tremendous research significance in the field of military aviation.

THEORETICALLY the Navy's new aircraft *Petulant Porpoise* could fly without a bottom. It was built with all controls above the splice line so that its hulls can be zipped on and off for testing the "new look" in longer hulls for seaplanes. By using the zipper method, research is saved the time and money it takes to produce a new airplane just to check the performance of new hull design. The first new longer type hull to be tested is one developed by Martin Aircraft and Stevens Institute. After it has been put through its paces, two NACA planing-tail hulls will be investigated. The result will be new faster hulls which pilots like and which handle more easily in rough water. The upper part of the zipper plane is a converted Grumman *Widgeon.*

THE AIR world was agog when the Byrd expedition flew DC-3 Douglas transports off an aircraft carrier in Antarctica. Those planes weigh nearly 15 tons. Admiral Byrd said that planes twice that size could easily operate from carriers. Not one single reporter wrote that significant statement into his news story! Now a Navy plane twice the size of the DC-3 has successfully flown from the deck of the USS *Coral Sea.* Two P2V *Neptune* patrol planes weighing 30 tons each successfully took off from the deck of the carrier. Their 100-foot wing span was only 13 feet less than the width of the ship's flight deck! First pilot off the deck was Commander Tom Davies, second, Lieutenant Commander John P. Wheatley. These *Neptunes* were the same type plane as the *Truculent Turtle* which Tom Davies flew to a world's non-stop record of 11,236 miles not too long ago. Significance? Now the world's longest-range plane can operate from the mobile base of a carrier deck and is not limited to places where land bases are available.

DOES that part of a jet engine's eerie wail which is so high pitched as to be inaudible to the human ear have any of the powers of the mythical banshee? Research conducted at the Navy's Aeromedical Laboratory in Philadelphia indicates it has not. The highly sensationalized claims of danger to the human body from exposure to high frequency vibrations have been debunked. A test group of nine enlisted men and one medical officer suffered no serious ill effects. Seven of the nine men reported they were more tired than ordinarily and five men lost weight varying from five to 19 pounds. Bureau of Medicine and Surgery experts concluded that ill effects upon human tissue appear unlikely unless the sound frequency is extremely high.

TWO months ago this column announced that the Navy would accept 650 civilian college graduates into its flight-training program. Scratch that notice. It's been changed. The Navy will accept 2,000 cadets during the coming fiscal year and will continue with large yearly quotas thereafter. To be eligible, applicants must be citizens between ages 18 and 25, unmarried, and have completed at least two full academic years toward a baccalaureate degree at an accredited college, university, or Jr. college.



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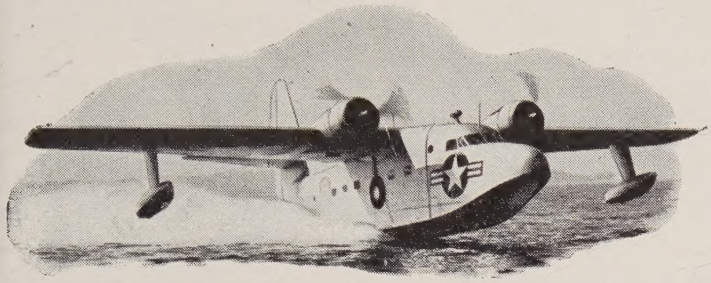

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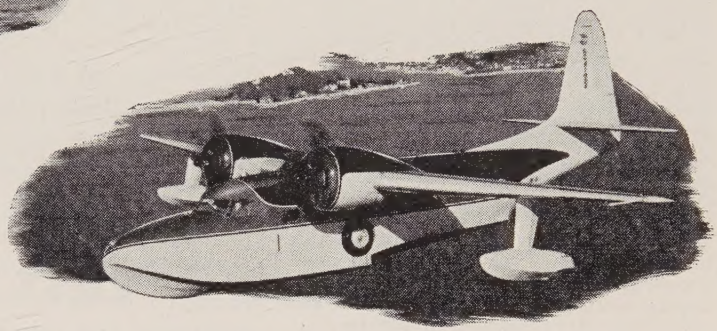

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PROP WASH

Aero Oddities

Fly-In Theatre—World's first fly-in theatre recently was opened at Asbury Park, N. J. Planes land on air strip adjoining theatre, taxi to ramp facing the screen, and pilot and passengers see movie from plane's cabin. After the show, a jeep tows planes back to air strip for take-off. Fly-in theatre can accommodate 25 planes and 500 cars. *(D. T. Barry, East Orange, New Jersey)*

Racy Repair. Woman phoned complaint regarding refrigerator she'd purchased from dealer some 40 miles away. Her message was relayed to repair man who was at airport at the time. He flew over in his *Cub*, landed directly behind disgruntled customer's home, repaired refrigerator and was back at home field few minutes after woman had first registered the complaint. *(J. Davidson, Tuckerman, Arkansas)*

Operation Unnecessary. When Texas boy swallowed wheel from toy train and it became lodged in this throat, Doctor bundled boy into private plane to fly him to throat specialist in nearby city. Doctor banked the plane sharply on making his approach to field at destination, boy gulped and dislodged wheel, making operation unnecessary. *(E. Gentry, Marthaville, Louisiana)*

Amen. Flight instructor L. C. Spain cracked up his airplane demonstrating "How not to fly an airplane" at air show. *(H. Helfer, Arlington, Va.)*

Crossed Up. At an air show at an Air Force field, a DC-3 with Goodyear cross-wind gear was being demonstrated. Tech Sergeant in a "Follow Me" jeep spotted castered wheel, thought landing gear was damaged and wheel was about to fall off, so leaped from jeep and frantically waved DC-3 to a stop. Refused to be convinced all was well until DC-3 pilot got out of ship, explained in detail operation of cross-wind gear. *(A. Dunn, Akron, Ohio.)*

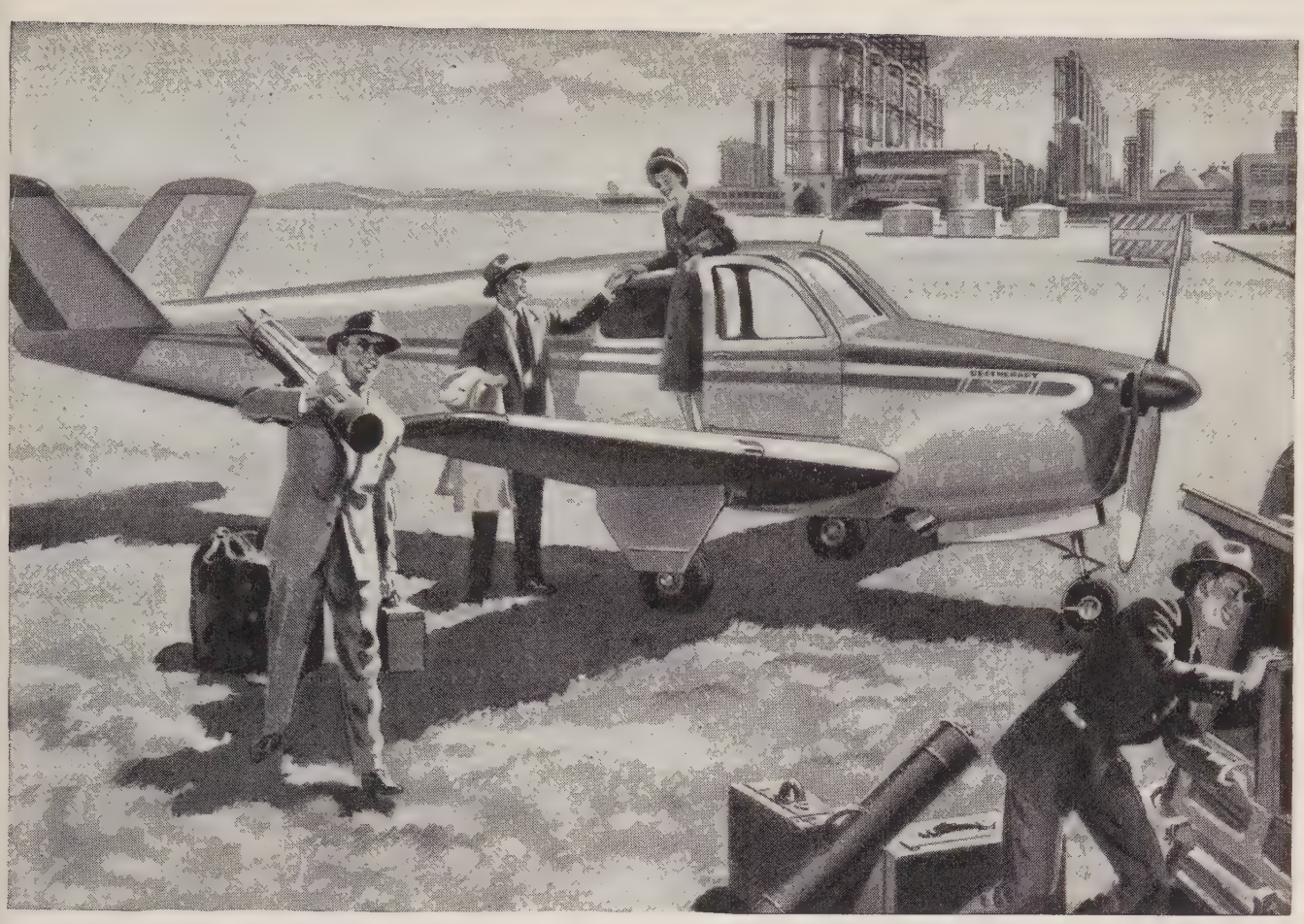
Dry Run. Ex-Army pilot, now farmer, borrowed crop duster's plane so he could dust his own fields. Took off from airport, flew to his fields, then discovered dust bin empty. Looking back he discovered he'd dusted countryside on way over. *(R. K. Doyle, Gainesville, Fla.)*

The Royal Bird. Hunting falcons are being trained by Britain's Royal Air Force to clear airfield areas of those slow but solid birds that each year do about $80,000 worth of damage to U.K.'s fast and hard-to-dodge military aircraft. *(D. L. Francis, Point Arena, Calif.)*

Reverse Procedure. A local pilot was shooting landings in a *Seabee* on a nearby lake. When he'd finished his practicing, he returned to the home airport, came in for a landing wheels up. An instructor dashed out on the field and finally called the pilot's attention to his error. Pilot put the wheels down, then overshot the field and landed in the lake that bordered airport! *(M. J. Breuer, Howard, S. Dak.)*

Att'n Readers:

If you have any news note oddities pertaining to aviation, send them to SKYWAYS, Box 17, 444 Madison Avenue, New York 22, N. Y. Five dollars will be paid the sender of each "oddity" printed. Contributions cannot be returned unless accompanied by stamped addressed envelope. The decision of the editors is final.



"Does Bonanza travel pay?

It triples my business!"

. . . reports Robert Yarnall Richie, industrial photographer

"In my 4-place Bonanza the other day, my assistants and I flew the 250 miles from Tulsa to Madill in 1½ hours. Between 2 p.m. and sunset I completed a big oil refinery photographing job. Next morning we loaded my 500 pounds of equipment and hopped to Longview, 225 miles away, for an equally big job there.

"The net result was completion of two jobs in two days, plus several contacts for future business. Gas and oil cost $12.85. Two comfortable, restful hour-and-a-half flights instead of two days of hard driving on the road. Many of my clients are off regularly scheduled routes, and public transportation would not serve us.

"I know of a manufacturer in Los Angeles, a doctor in New York, and an engineer in Texas who, with their Bonanzas, have tripled the area they can see to personally—and at great personal profit. The Bonanza certainly *is* a revolutionary new kind of business machine."

Top speed, 184 mph
Cruising speed, 172 mph
Range, 750 miles

● A note on your company letterhead will bring an informative brochure on "The Air Fleet of American Business." Write today to Beech Aircraft Corporation, Wichita, Kansas, U.S.A.

BEECHCRAFT
BONANZA
MODEL 35

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

LET'S FEDERALIZE ANG

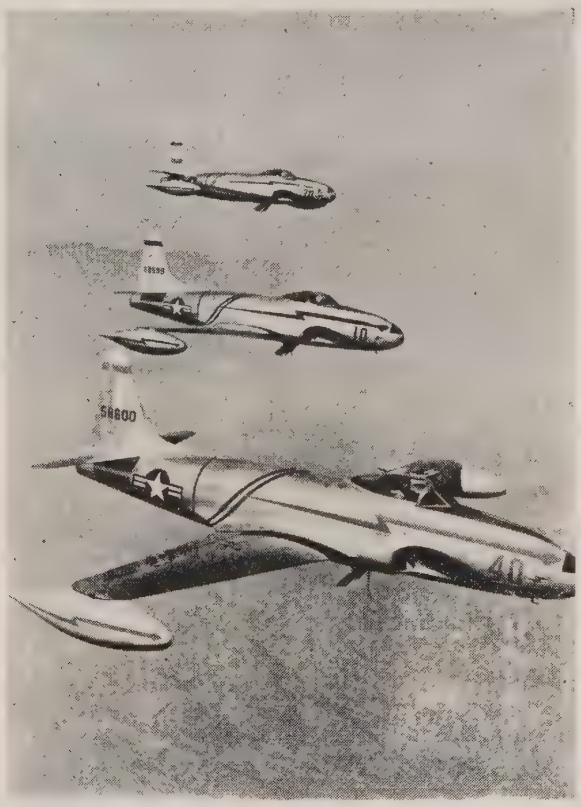
BRASS of Air Nat'l Guard, Col. Ervin, Col. Robertson, Maj. Gen. Cramer, go over issues with Gen. Stratemeyer

By Carl Hinshaw

Member of House of Rep., Calif.

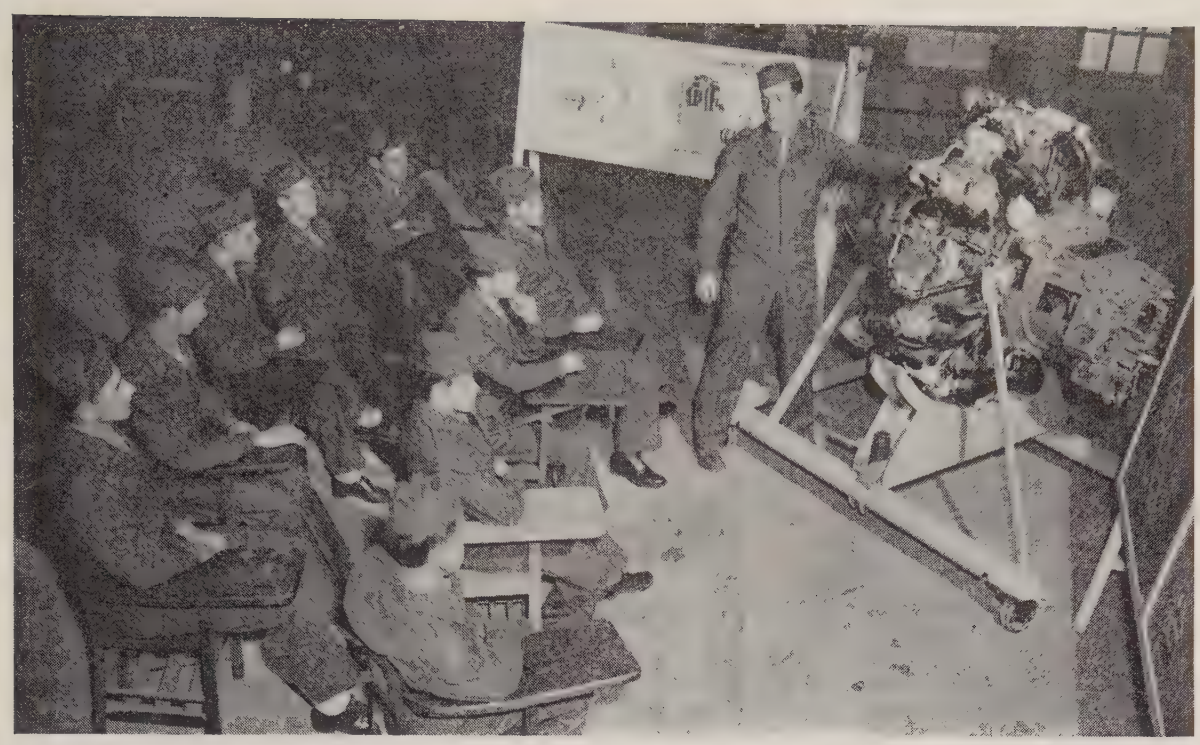
Air National Guard is vital asset to the defense of the United States

THE VILLAGE fire department is a fine institution, but it would be of little use in a big city fire. Our old National Guard System, developed out of the colonial militia, and maintained through the years of the Republic under State control for police purposes, is equally out of step with the times. It is true that the Guard is subject to call by the Federal



FIVE SQUADRONS of the Air National Guard soon will be equipped with F-80's to aid in protection of the U. S.

ANG UNITS based West of the Mississippi are flying fast F-51 Mustangs, while Eastern units have F-47's



TRAINING is important part of Air National Guard program. Sgt. Miller (above) instructs group of 17-year-olds in fine points of engine maintenance, while Sgt. Plunkett (below) demonstrates inspection of parachutes

Government in time of war and that it has performed magnificently in times of national emergency.

Now, however, we are faced with new conditions and new demands for total protection of the United States. Air power has changed the face of the world and obliterated both State and national boundaries, so far as attack is concerned. We are at last aware that in another war, every part of the country would be subject to bombing by hostile planes and that we must establish the strongest possible territorial defense if we are to prevent *(Continued on page 39)*

TEST STAND for electrical units calls for instruction. Here Sgt. Walker (left) gives pointers to Pvt. Haggard

AIR RACER Ronald G. Pucket applies a wrench to his F2G Corsair as he works to up the horsepower in ship's engine

TWA MECH Hugh Maddox (below left) spends his spare tiem helping Puckett get Corsair in shape. Here he applies

PUCKETT is an oil salesman 364 days of the year. On 365th day he races. Last year he was forced out by engine trouble

HELPMATE in the hangar as well as at home, Betty Puckett also works with her husband in getting Corsair ready for '48 race

Labor Day PILOT

By JAY WILLIAMS

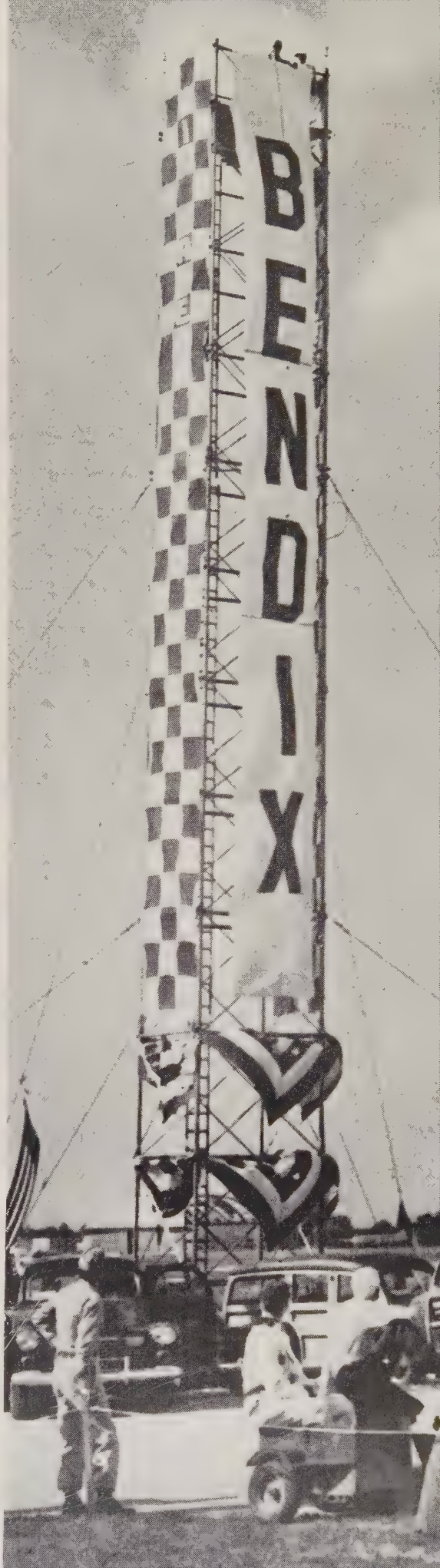
TO MOST people, the first Monday of September is a holiday reserved as a period of rest for those who labor the other 364 days during the year. But for Ronald G. Puckett, who spends the remaining number of days selling oil in Washington, D. C., Labor Day is the most strenuous diem per annum.

On that afternoon, Puckett can be found herding 3,000 horsepower around a limited area at Cleveland, Ohio, in an airplane known to the Navy as an F2G *Corsair*. On this day Puckett steps out of his "average American" role and along with 11 other pilots assumes the role of celebrity as an eager crowd of from 20,000 to 30,000 people watch the Thompson Trophy event of the annual Cleveland Air Races.

For most of the contestants, flying is their everyday business. The race on Labor Day is just an accentuation of their normal routine, such accentuation being eminent in the added dangers and limitations which do not usually accompany their flying.

For Puckett, however, it's an out of the ordinary thing. Aside from flying with the Naval Air Reserve one weekend a month at the Naval Air Station, Anacostia, D. C., he seldom gets in an airplane. Neither his limited time nor funds will allow it.

What money and time Ron finds goes into the F2G which he acquired in 1947. The *(Continued on page 43)*



Pilot's Report . . .

RYAN *Navion*

FERRY FLIGHT from San Diego, California to Reading, Pa., was flown by Pilot-Author Don Downie and his wife, Ruth

By DON DOWNIE

This is the 3d in a series of impartial pilot reports on four-place aircraft

FULL-LOAD take-off with the Navion proved the ship a good one for getting off the ground and up in a hurry

NAVION dipped a wing over Pittsburgh and pointed to the Tower of Learning and an adjoining baseball park.

Allegheny tower operator cleared NC4241K for straight-in approach when Downie called in over range towers

NO THERE'S nothing new about the Ryan *Navion*.

It wasn't enough to bake on a paint job, re-style and soundproof the interior, improve the ventilation, re-design the fuel system and add an auxillary fuel tank as extra equipment. Now the latest model has larger brakes, a new engine-driven fuel pump and a cabin dome speaker for its more powerful radio. Even a new series Continental engine is now being installed.

For this SKYWAYS pilot report we flew Ryan *Navion* NC-4241K painted a brilliant green

PHOTO of Navion panel in flight showed she was indicating 125 mph at altitude of 9,600 feet at 2175 rpm

KIRTLAND AIRPORT at Albuquerque was highest field the Navion hit. Note ship's flaps blown down by wind gusts

called "zircon," from the San Diego, California, factory to a distributor in Reading, Pennsylvania. Comments on the *Navion* are therefore based on over 20 hours of leisurely cross-country flying in some beautiful weather plus some not-so-attractive rain squalls.

Since this flight was arranged through Bill Wagner of Ryan, we were ferrying the plane for a distributor that we had never met. Naturally, a factory check-out was required to cover insurance requirements. William "Doc" Sloan, sales demonstration pilot for Ryan, did the checking which actually amounted to nearly an hour of flying salestalk and a demonstration of the performance of the new *Navion*. "Doc" was formerly Commanding Officer at the famous Thunderbird Field in Phoenix, Arizona. This check flight was made in NC-8966H, originally a North American model but modernized by Ryan to their 1948 model standards. Every plane off the Ryan assembly line has been sold to dealers in advance and the factory has yet to produce an airplane for its own use.

There's no way around it, the first time you climb into the front seat of the *Navion*, it looks complicated. It takes more than a couple of landings to feel completely at home in the plane, but at the end of a dozen hops, the mechanics of hydraulic-boost-on, wheels-down, prop-forward and flaps-down became practically automatic. As long as an airplane is designed with a retractable landing gear, controllable propeller and flaps, there are bound to be a few more knobs and switches than in a *Cub* trainer.

"Doc" Sloan showed us the accepted pre-flight check in the cockpit. While transport-type check-lists are avail- *(Continued on page 42)*

BAD WEATHER accompanied the Downies into the field at Harrisburg, Pa., but they were able to get off anyway

DESTINATION was Reading Aviation, where Harding Breithaupt accepted his new Ryan Navion from ferry pilots, the Downies

NAVY'S PIRATE: The XF6U-1

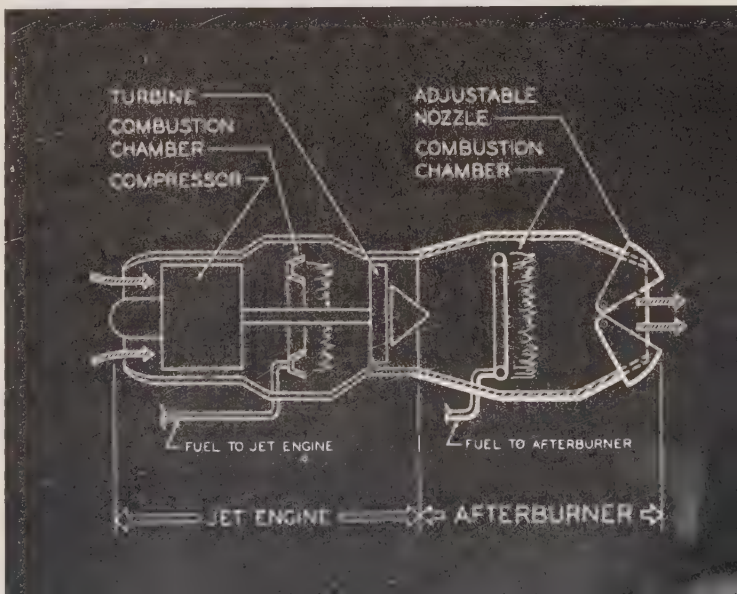
PIRATE came into being as a fighter in "550-mph class," then Solar afterburner was added. Compare tail section of newest Pirate (above) with that of first XF6U (below right). New XF6U is in the "over 600-mph class"

By JERRY LEICHTER

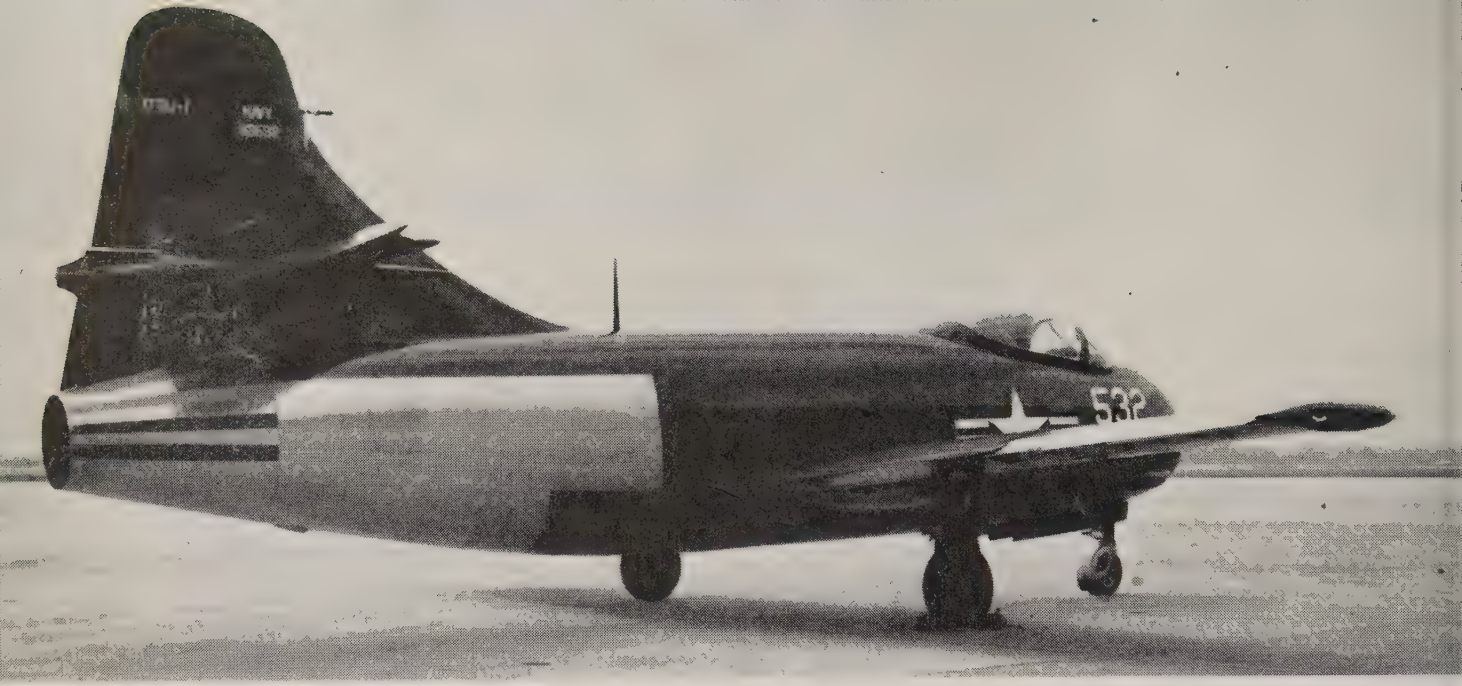
IT MUST be a little boring by now to read that "this is the fastest plane I've ever flown," or "the best I've ever been in." The developments of the jet age practically guarantee that every new plane off the drawing boards will have some unusual facet that will set it apart from the others already in the sky.

Here's an airplane that has its share of jet firsts, yet it may never set a speed record and, despite its sleek finish, it probably will never place in an aircraft beauty contest. The Navy and Marine pilots who will eventually fly the production models of the Chance Vought *Pirate* can be sure of one thing, however—they'll have a top-level jet fighter that has the potentialities to match or out-perform and out-fight any jet up to the limits of the sonic barrier.

The vagaries of postwar military security have put a "well over 500-mph class" label on the plane, but pinning the figure down a bit fine it might be said that the Westinghouse



DIAGRAMATIC DRAWING shows Solar afterburner attached to Westinghouse jet engine to add to ship's thrust



MODIFICATIONS of tail included new dorsel fin to add strength. Paint strips on tail cone are for heat tests

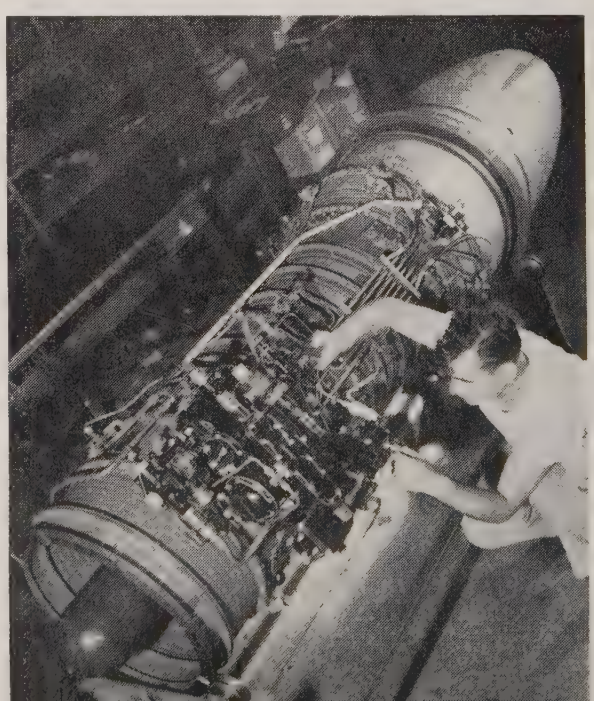
PROFILE photo of first Pirate shows difference in tail-section design before the afterburner was installed

axial turbojet-powered *Pirate* is in the 550-mph class. Now that would be quite slow in today's fly-by of 600-mph jet fighters, but the *Pirate* happens to have the first U. S. installation of a production after-burner (developed and built by the Solar Company of San Diego), which is simply an auxiliary ramjet power plant. Simple or not, the after-burner has not only changed the orginal profile of the *Pirate*, it has increased the effective thrust of the jet by 30 to 50 per cent which also increases the top speed for short periods of time to well over 600 mph. The *Pirate* not only has a lower and more economical cruising speed than other conventional jets, but it has as great a top speed whenever needed, a power operation comparable to water-injection boost on reciprocating engines.

That's one angle on the performance of this first Chance Vought jet-fighter design. For another aspect you'll have to take the words of its engineers and test pilots. As an indication of its maneuverability and control it is claimed to have the fastest rate of roll of any jet in the skies today, which also means any aircraft. In the words of one test pilot, "it's like flipping a coin," except that a coin falls while the *Pirate* literally seems to suspend about its longitudinal axis as is rolls through the sky. The crowning touch on its performance is the fact that while it has the shortest wing span and is at the present time the smallest production jet fighter, it lands at between 80 to 85 mph, although it weighs about 10,000 pounds gross.

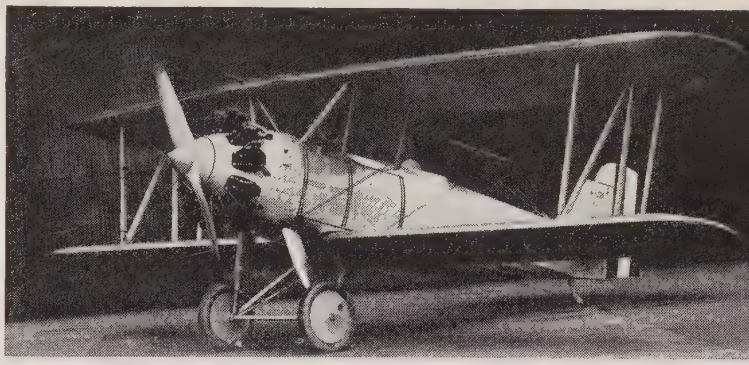
The plane is more than an unusual new Navy jet fighter. If past history is any criterion, it is entirely possible that there will be some type of aerial *Pirate* flying with the Navy more than 22 years from today. It is also within the realm of

POWER PLANT of the XF6U-1 is Westinghouse 24C axial-flow turbojet. Mech here makes final jet adjustments



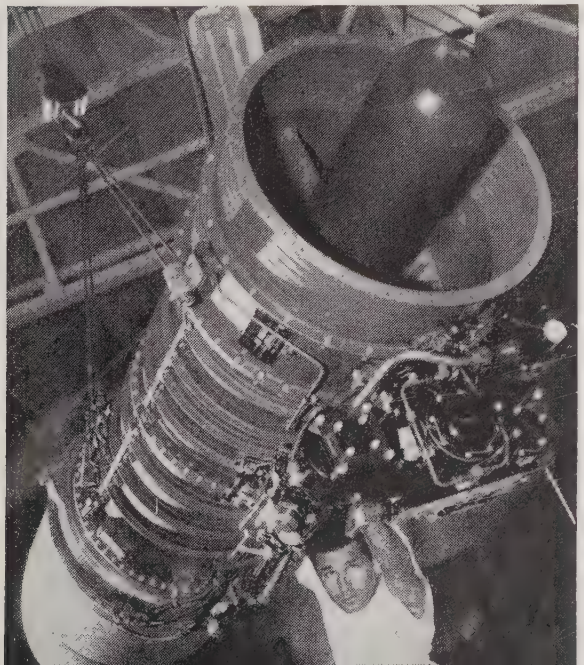
LATEST CORSAIR, still in production, is the F4U-5. It is powered by R 2800-E type Pratt and Whitney engine

probability to predict that as long as U. S. Naval Aviation exists it will include Chance Vought aircraft. Crystal-balling aviation history like that might seem a bit far-fetched except for two concrete facts: 1) the Navy's first aircraft carrier, the *U. S. S. Langley,* was exclusively equipped with Vought VE-9's when commissioned and there have been Vought aircraft operating off carriers ever since; and 2) the first Chance Vought plane to bear the name *Corsair* was the 02U-1 built in 1926, and there has been some type of Vought *Corsair* in operation with the Navy ever since. This includes the latest, still in production, the new F4U-5, claimed to be the fastest, most-powerful, single-engine, propeller-driven fighter in the world. Following the generic history, the *Pirate* is merely an extension of the *Corsair* name in Navy annals.



FIRST CORSAIR, built for the Navy back in 1926, was designated 02U-1. Factory then was in Long Island City

JET ENGINE has an over-all diameter of 27 inches and includes 11 axial compressor stages, one direct-flow chamber

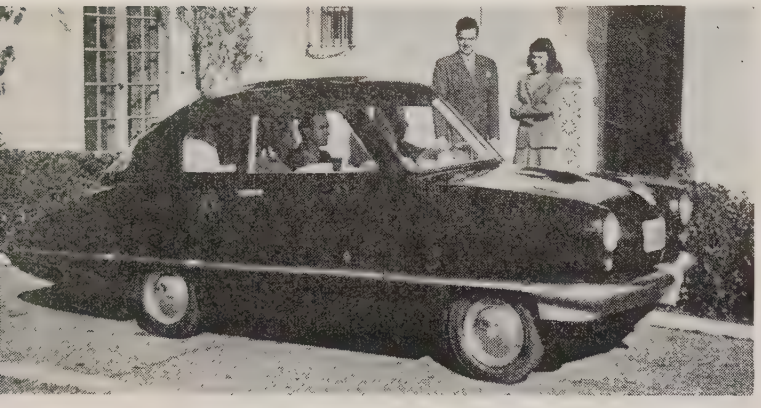


At that, it's quite an extension. The new tricycle-gear fighter is built for either carrier or land operations and one of its distinctions is that its short wings do *not* fold for carrier storage. Its modifield sleeve-type dropable wing-tip fuel tanks are equipped with supplemental navigation lights and, due to the bulge incorporated in the wing tips for the purpose, the tanks can be safely dropped without the need of either springs or an ejector mechanism. Carrier storage will be aided by "kneeling" the plane on its nose gear.

The XF6U-1 designation actually includes three different aircraft which are used for testing the various installations going into the production model. The first of the F6U-1's have already started through the lines of the Stratford, Conn., plant of the Chance Vought Aircraft Division of United Aircraft Corporation while production continues in the same plant on the F4U-5 *Corsair.*

The history of the *(Continued on page 47)*

Fly It . . . or Drive It



FLYING AUTO seats four. Its engine is located in rear, has steel-aluminum roof to support the flight section

JACKS, carried in wing's tubular spar and made of aluminum, support flight section when detached from the car

Convair's Flying Auto provides good ground travel as well as air travel

SINCE the early 1930's aircraft designers have tried to come up with an airplane that would provide ground transportation as well as air travel. Practically all of the planes of that type that were built looked more like Rube Goldberg devices than they did cars or airplanes. And most of them flunked out, too, when it came to performance. Such is not the case with this *Flying Auto,* designed and built for purely experimental purposes by Consolidated Vultee. This car-with-wings not only looks like a car and drives like one, but it rates an "A" for aircraft performance. Built to seat four comfortably, the Convair *Flying Auto* is powered by a 26½-hp Crosley engine for ground travel, and 190-hp Lycoming engine for air travel. The car has fluid drive, hydraulic brakes and shock absorbers. Actually, the *Flying Auto* is a regular automobile to which is attached a flight section, each component having its own power plant. According to unofficial estimates, the *Flying Auto* will match the flight performance of any four-place plane that is on the market today.

FLIGHT SECTION and car are joined at three attachment points atop car. Separated, car drives off on own power

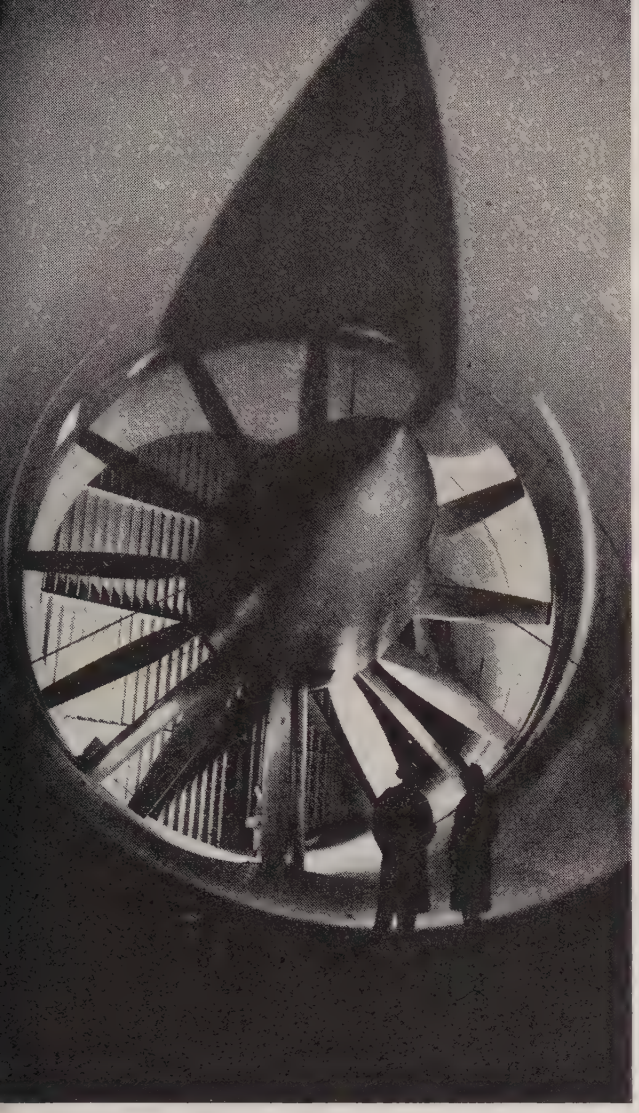
STEEL TOP of the car section is strong enough to support six times weight of flight section. Engine is a 190-hp Lycoming

BAGGAGE is carried in nose of Flying Auto. Plane, thus far, is strictly experimental, no plans for production

WHEEL is for driving, control column is for flying. When not in use, the control column folds back into ceiling

FREE SPINNING tunnel of NACA laboratory is test area for studying spin characteristics of new plane designs

FLIGHT PROPULSION lab at Cleveland, Ohio, is home of research in problems of propulsion for tomorrow's ships



NACA LAB for engine testing has this 12-bladed prop which is used to create high velocity for engine tests

Aviation's WHIP

By W. H. HUFF

Lieutenant Commander, USN

National Advisory Committee for Aeronautics flies tomorrow's ships today

AT THE END of 1947 the United States held all four of the established world aviation records. The Air Force held the altitude record and the closed-course speed record. The Navy held the long-distance record and the speed record, aviation's most coveted prize. The holder of this last record is usually considered to be the world's aviation leader. The U. S. has shattered this mark several times this year. The last mark (by North America's jet XF-86) moved aircraft speeds up to "more than 650 mph," faster than the speed of sound, in fact. This feat was a fitting coronation ceremony for America's new royal family of the air—jet propulsion. The speed potential of propellered engines stops somewhat short of the speed of sound, and with speed spelling leadership of the air, the jet is King.

Primarily responsible for America's favorable position in the aviation race today, are the military—for furnishing the money and demand; the aviation industry—for furnishing the tools, engineering and production "know how"; and an organization that swings a large whip, the National Advisory Committee for Aeronautics.

The NACA is a pre-design organization and the majority of its work is pure research. As a result, little of NACA's work is apparent to the general public when a new airplane appears. But "the mark of the beast" is there.

The new plane—any new plane—will probably have an NACA cowl, NACA anti-icing equip-

ENGINEER at laboratory in California adjusts a rake employed to survey wake pressures on a Lockheed P-80A

ICING TESTS show accumulation of clear ice on three glass panels at right and on nose of B-24. Bottom center panel was electrically heated, kept clear of ice. Grumman F7F (below) is mounted in wind tunnel for tests

the group it advises; and it is fully capable of carrying out in its own research laboratories, and with its own scientists, the aviation projects it feels the need for. The NACA research facilities are the best in the world and the men at work in their laboratories are the best the nation has to offer.

Supersonic investigations have been going on within NACA since 1929. A jet engine was in operation down at Langley Field laboratory as far back as 1935. No one was interested in the new-type power plant but NACA at the time. The Air Forces XS high-speed aircraft project and the Navy's D-558 project were both initiated on NACA recommendations. These two projects are still being carried on under NACA tutelage. Today these planes are being flown by NACA pilots and the information gained is being recorded and analyzed *(Continued on page 50)*

PREVENTION and removal of ice on aircraft is important part of research at NACA's Ohio laboratory

ment, NACA laminar-flow wing, etc. Much of the design information that made the plane possible will certainly be NACA.

And how does NACA get into the aircraft picture? As a matter of fact it IS the picture. The National Advisory Committee for Aeronautics is composed of some 32 committees and subcommittees whose members are drawn from throughout aviation. Serving on the top board are the heads of the Air Force, Naval Aviation and CAA. The whole aviation industry is represented on the working committees and subcommittees operating below the big board.

The National Advisory Committee for Aeronautics is unique in two other respects: it is an advisory organization truly representative of

Barnyard Barnstormer

By W. CHASEY and C. HEGGEN

ON HIS ranch near Siloam Springs, Arkansas, M. M. Churchill frowned over his prize Jerseys which had been stricken with a mysterious malady early that morning. He had already put in an emergency call to young Dr. C. A. Mohr, Jr., of Tulsa, Oklahoma—a specialist in cattle ailments. Churchill's frown deepened as he searched for signs of Doc's approach—not down the dusty road, but in the vast blue stretches of sky toward the west. For "young Doc" makes his calls in a gleaming white Stinson L-5 with a blue cross, the symbol of veterinary medicine, painted on its side and Doc's personal trademark, a flying syringe, emblazoned on the cowling.

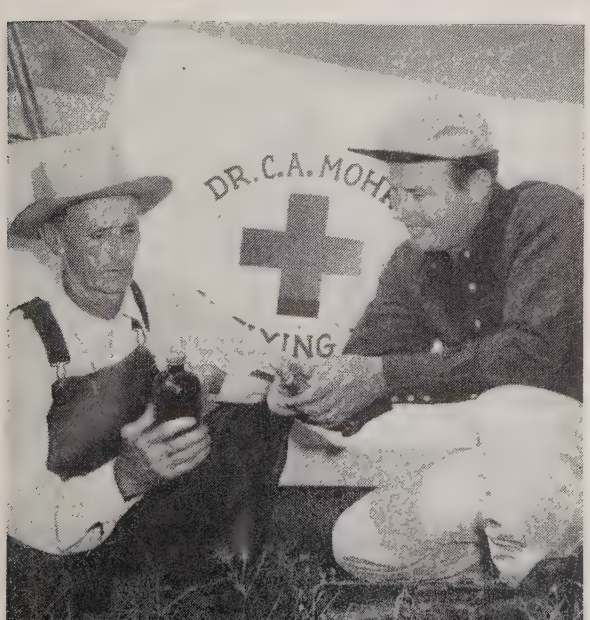
In 1942, Churchill was Dr. Mohr's first "air customer"—and before Doc flew over, he instructed the Arkansas rancher to stick up a fish pole with a rag tied to it so he could see which way the wind was blowing. Now, over five years later, with a 2,000-mile-a-month flying average under his *(Continued on page 53)*

FLYING VET is young Dr. C. A. Mohr, Jr., shown here in cockpit of BT-13

NEWBORN COLT lived because "young Doc" got there in time, thanks to Mohr's easy-to-land-anywhere Stinson L-5

WELCOME SIGN to cattlemen in Southwest is the blue cross, symbol of veterinary medicine, on Mohr's L-5

DOC MOHR, well-known as a cattle specialist, has been flying for over five years, averages 2,000 miles a month



Know a good Lawyer?

State and local officials interpretation of CAR impedes flying

By WILLIAM WELSH

IF YOU don't then you're treading on thin ground these days.

For flying has become a precarious interest for the private pilot who doesn't have an amiable, trusty, sharp mouthpiece at telephone's reach.

When the Federal Government held complete control over private pilots, the situation was bad enough. Every time a flyer took his 65-hp off the ground, he had to bear in mind all the technicalities of Civil Air Regulations, parts 43 and 60. Too many winged sportsmen and businessmen found to their regret that their interpretation of the regulations was too literal—not far technical enough.

But now that CAB budget slashes have forced a partial decentralization of enforcement and punishment over reported violations in the air, state and local officials in too many states throughout the nation have flagrantly employed their delegated powers to impede private flying.

Pilots' complaints of "being taken advantage of" by Justices of the Peace, desirous of filling their pockets, and eager police and peace officers, arrest-happy and bucking for promotions, are legion.

Law enforcement as a whole has not come to realize that flying is no longer just a sport—a toy with which only the rich can play. It has failed to comprehend that a man who barely affords to keep a car on the highway may find it more economical to use a plane for travelling and, for that reason, primarily, engages in flying.

The majority of judges and arresting officers look on flying as a novelty in which the practitioners must be so rich as to be able to support monetary punishment for alleged offenses in

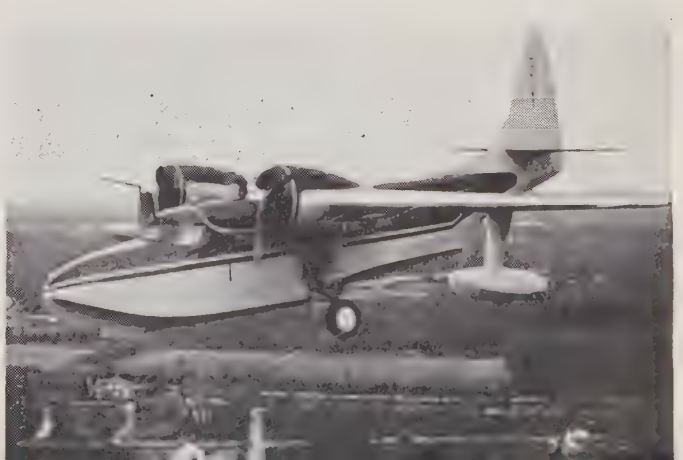
PILOT of this plane claimed emergency landing on a New York parkway was unavoidable. Police claimed otherwise

HOW HIGH IS UP might well be the question here. Experience has proved that people on ground are poor judges of altitude, but don't dare pedestrian's judgement by flying low like this Seabee (above) or Mallard (below)

proportion to the expense they encounter in flying.

When we suggested earlier that you get a lawyer, we meant it as a precautionary measure. A corrective—and more preferable measure—is for you to help eradicate the situation by: 1) realizing what the problem is and how it may trap you, and, 2) to make the danger negligible by educating yourself, your fellow pilots *and* the government.

Each flyer or each individual with an interest in aviation should assert himself to have the flyer put on the level with the driver of an automobile. Then — *(Continued on Page 54)*



ART CHESTER had to reduce tail-skid weight and move gear back on his V-tailed racer to get better ground control

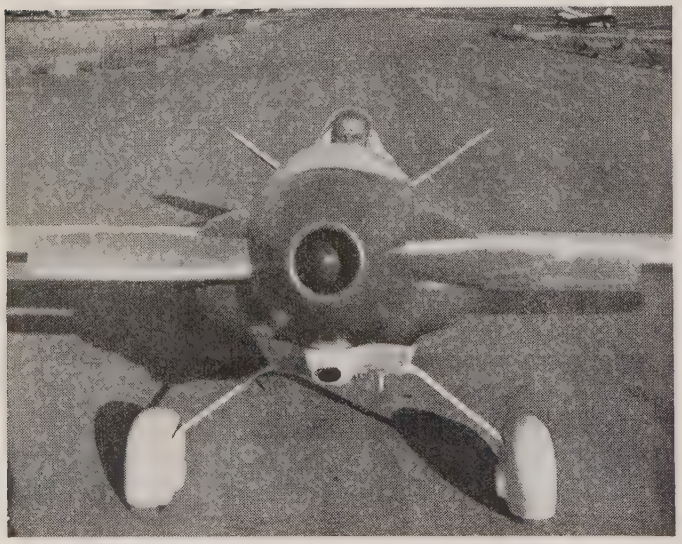
So . . . you want to be a

RACING PILOT

Air Race winner offers beginners a formula for flying and winning good race

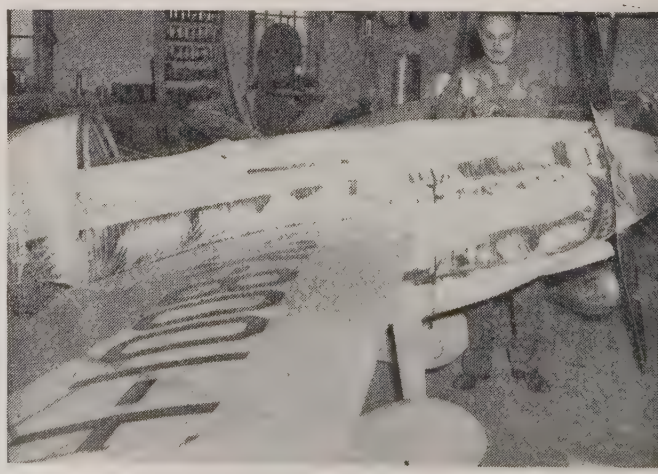
By ART CHESTER

President, Professional Race Pilots' Association



NUMBER TWO racing plane in this year's Chester stable is "Wimpy" (above). Note its air intake in prop spinner, and its cut-down propeller. An important "extra" in "Wimpy" is the lap counter (below) mounted on the panel

CHESTER checked air flow by white-washing ship, then flying it through rain cloud. Eddies showed in paint



WANT to be a racer, eh?

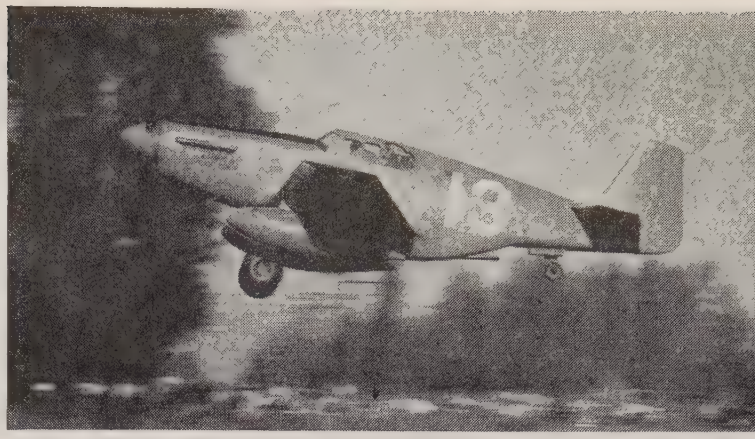
If you just happen to have a surplue P-51 or clipped-wing P-63 parked in the backyard, it'll be easy. If not, you'd better start out in the midget-plane class.

Air racing today is sharply divided into two distinct classes: the heavy 400-mph surplus conversions for the Bendix and Thompson races against the new 190-cubic inch midget-plane class used in the Goodyear event.

Surplus racers, I believe, are on their way out. These ex-Army jobs may be out in front for another year or two, but soon enough designers will come out with something that will out-fly them. After all, you can only hop-up an engine so far, and there is a point beyond which wings cannot be clipped if the airplane is still going to fly. Removing armor plate and other military equipment will cut down the weight materially and then a certain amount of wing area may safely be whittled away, but when you're all through, you have a butchered-up airplane that is not necessarily well designed.

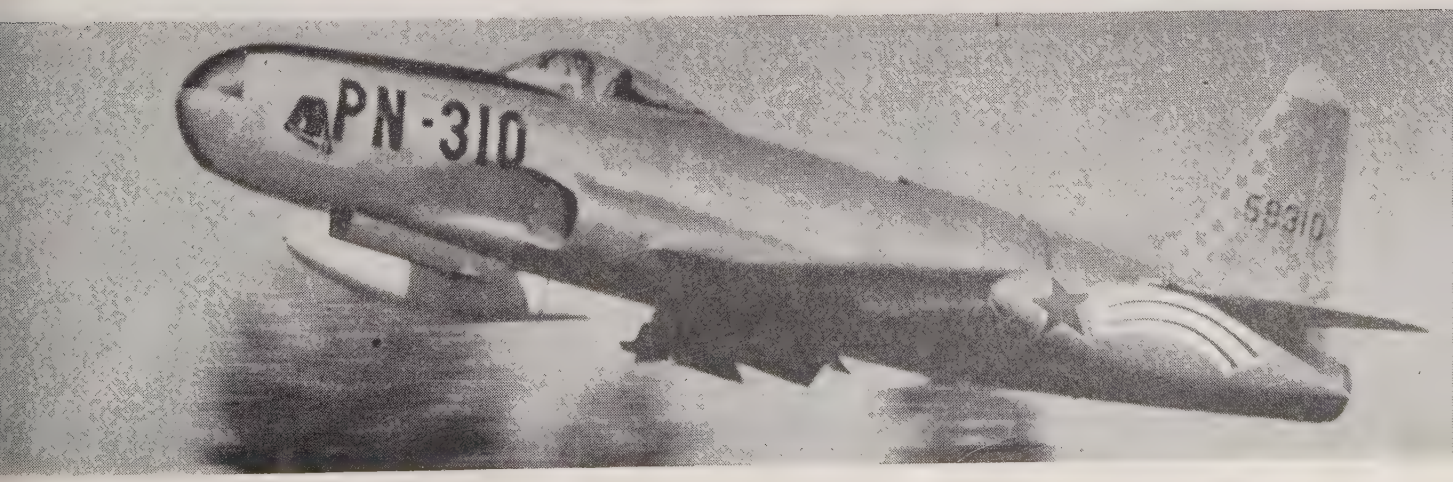
The Bendix cross-country race is a slightly different proposition. It is primarily a contest to bring nation-wide publicity to the Air Races, and can be flown with nearly stock surplus planes. This event annually draws some of the best pilots in the country, and because of the $25,000 in prize money, a good deal of expense goes into converting and refining aircraft for this one race. This year the event will be open, for the first time, to foreign-built aircraft, and a number of British *Mosquitos* are being groomed for take-off. But if you're not a Paul Mantz or Jacqueline Cochran who can keep a plane for just one race a year, you're just about out of luck in the Bendix.

That leaves the midget class as the easiest way for the newcomer *(Continued on page 52)*



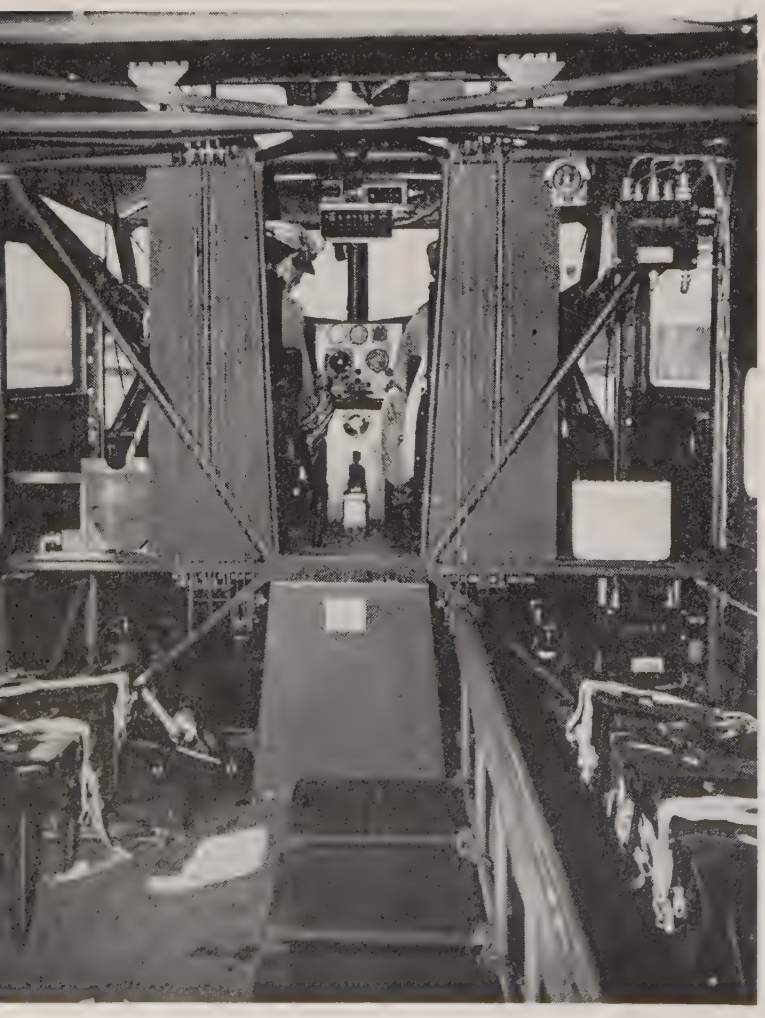
RACES like the Bendix X-G can be flown in stock models. Jacqueline Cochrane who placed second in '47 Bendix flew F-51 Mustang (above) and came in 10 minutes behind winner Paul Mantz. 1948 Bendix is open to foreign ships

BENDIX RACE also included a jet division, designated "J." Planes that competed in this race were limited to U. S. Military service jets. Photo (below) is of an Air Force F-80 on its take-off from Los Angeles in Bendix "J" Race

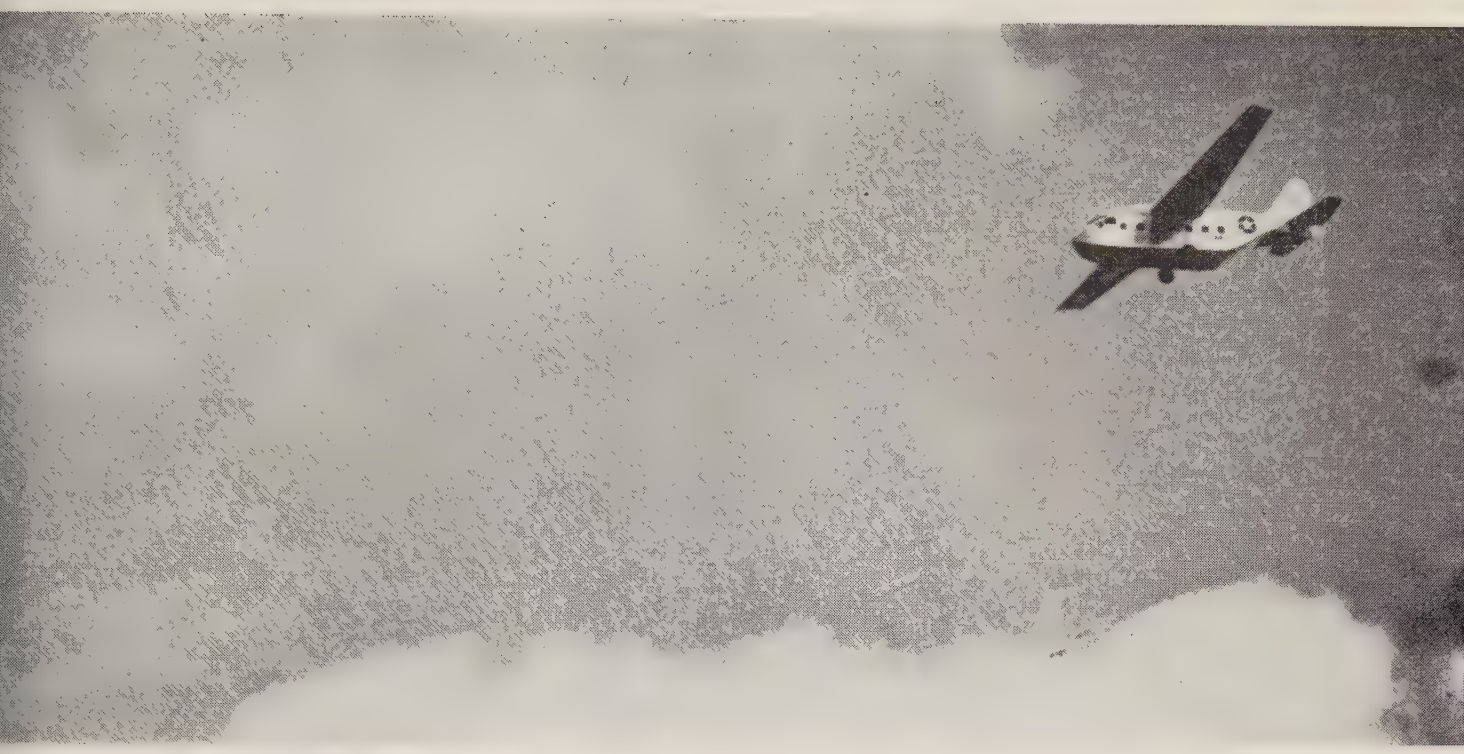


AVITRUC, built by Chase Aircraft for Army Field Forces, has a top tow speed of 216 mph. Most of the towing so far has been done by a Fairchild C-82. Thirty fully equipped troops sit in glider's three rows of seats

High-Speed HAULER



FEATURE of the XCG-18A all-metal glider is its hydraulically operated rear door and ramp combination for loading

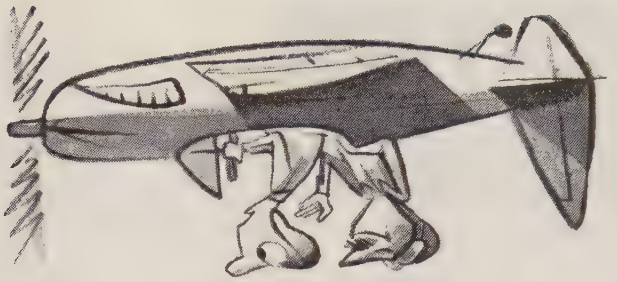


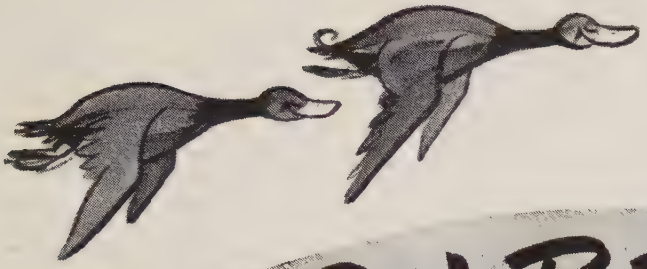
DURING World War II, the top glider tow speed was less than 175 mph, but this was thought to be "on the fast side." Just as the speeds of today's military planes have been substantially increased, so are the towing speeds of the new gliders. The XCG-18A, first all-metal glider designed specifically for Army Field Forces, boasts a top towing speed of 216 mph, higher than any other glider. Known as the Stroukoff *Avitruc,* this 8,000-pound glider can transport 30 fully equipped combat troops. Or, as a cargo glider, it can haul a three-quarter ton weapons carrier, or a ton-an-a-half truck, or a jeep and 105-mm Howitzer as a combined load. Loading is via a rear door and ramp combination which operates hydraulically.

The *Avitruc,* built by Chase Aircraft Corporation of Trenton, N.J., has a wingspan of 86 feet, is 53 feet long and 19 feet high. It has a stalling speed, fully loaded, of 60 mph.

DESIGNED specifically for assault purposes, the Avitruc has been built as a permanent unit. Its welded steel-tube fuselage is covered with light aluminum aircraft skin as a defense against incendiary gunfire

Too-loose chute straps get Dilbert in the end

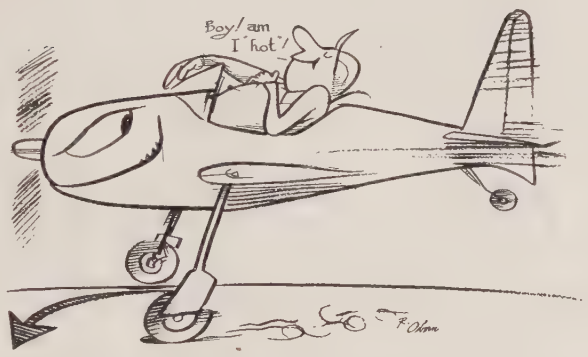




DILBERT

By S. H. Warner and Robert C. Osborn

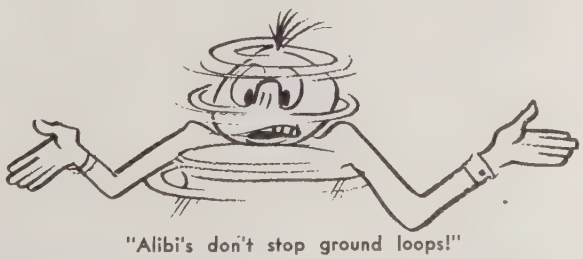
COMPLETE THAT LANDING — Listen to this groundloop alibi. "I made a good landing. As I slowed down, I applied brakes and started to raise my flaps. When I looked up, I noticed the plane had started to groundloop to the left. I immediately applied right brake and full right rudder. The plane continued to turn, so I gave her a burst of throttle, but the turn only got tighter. Right after I cut the switch, she nosed over."



By his own words, this pilot hung himself on two counts. First, he didn't complete his landing. A landing is never completed until the airplane has slowed to taxi speed. This groundloop developed while the pilot was concentrating on other matters.

Second, he used throttle to correct a well-developed groundloop. The use of throttle to prevent a groundloop in heavy planes is a delicate operation. Throttle is effective *only* during the early stages of the landing run, while there still is good rudder control. Only short bursts should be applied and then only at the first indication of deviation from course. Throttle will only accentuate a turn after it is well started, particularly a left turn, because of torque.

It's a cinch, you can't stop a groundloop with an alibi! It hasn't been done yet.



"Alibi's don't stop ground loops!"

PLAN YOUR X-C—You'd be surprised how many Dilberts have forced landings while flying cross-country, solely due to running out of fuel. Lack of gas may be the immediate cause of an accident, but it never can be accepted as an excuse. The underlying cause is always pilot error.

Here are a few hints on how to avoid this unnecessary emergency:

a. Make certain you are fully gassed before take-off.

b. Know how much fuel your engine uses for all power settings.

c. Keep a running check on your ground speed and fuel con-

(Continued on page 58)

CAOA REPORT . . .

CORPORATION AIRCRAFT OWNERS ASSOCIATION, INC.

Corporation Aircraft Owners Association is a non-profit organization designed to promote the aviation interests of the member firms, to protect those interests from discriminatory legislation by Federal, State or Municipal agencies, to enable corporation aircraft owners to be represented as a united front in all matters where organized action is necessary, to bring about improvements in aircraft, equipment and service, and to further the cause of safety and economy of operation. The CAOA headquarters are located at 444 Madison Avenue, New York 22, N. Y.

CAOA Forum . . .

As this issue goes to press, pilots and executive representatives of companies and corporations owning and operating executive aircraft are getting ready to gather in Washington, D. C., to attend a forum being held under the sponsorship of the Corporation Aircraft Owners Association.

With over 800 companies operating 1,000 multi-engine executive ships in daily flights, the import of this group in the field of aviation activity is comparable to that of the scheduled airlines. Therefore, this forum, dedicated to the discussion of problems relating to the use of executive aircraft, is one of the most important events on the calendar of corporate aircraft activities. The fact that this is the first such forum to be held exclusively for corporate aircraft operators adds to the importance of the gathering.

Guest speakers, in attendance to aid in solving problems peculiar to the operation of executive aircraft, include officials of the Civil Aeronautics Administration and the military services, fixed base operators and executive heads of the oil companies.

The results of the CAOA Forum will be reported in October issue.

Aircraft Identification . . .

The recently amended Part 43 of the Civil Air Regulations calls for the elimination of the "R", "X" and "L" from the license numbers of aircraft that are painted on the ships' wings. The "NC" number hereinafter will be just "N", with the word "standard", "restricted", "experimental" or "limited" inscribed just above the entrance to the cockpit, or just below it. In short, instead of the license number painted on your ship's wing as "NC77777", it will be plain "N77777".

Automatic GCA . . .

A new automatic GCA unit which completely eliminates the need of an operator is now undergoing flight tests by the Air Force's Watson Laboratories at Red Bank, N. J. In the early days of GCA, five men were needed to man a single GCA unit. This subsequently was reduced to one man, and now Gilfillan Bros. of Los Angeles, California, builders of GCA units, have made the set entirely automatic.

This GCA unit consists of an automatic tracking device which picks up the "pip" of an airplane on the radar screen as it turns into its final approach to the runway and transmits electronic signals to the set in the plane. These signals tell the pilot his off-course error and the error, if any, in his rate of descent. The pilot can then either correct manually or use the set automatically by connecting the auto-pilot which is operated by electronic impulses from the tower set.

Results of the flight testing of this new automatic GCA unit will be reported as soon as the data has been officially compiled by the testing laboratory.

Pilots Approve Convair-Liner

Many companies and corporations have expressed an interest in the availability of the Convair-Liner for executive transport operations. According to reports of the pilots who have flown this ship, the Convair-Liner is worthy of that interest.

The spacious, comfortable and simplified cockpit of the new Convair-Liner has drawn the nods of approval from professional pilots. All buttons, switches and levers are placed so as to be conveniently accessible and easily operated. A new type of gust lock is said to be entirely foolproof, and the most important instruments that require constant checking are grouped in a T arrangement which facilitates that checking with a minimum of eye movement. In addition to this simplified cockpit arrangement, pilots report the cabin of the Convair-Liner to be very comfortable and extremely well lighted.

Probably the Convair-Liner's most important appeal-point to pilots is its handling characteristics. Airmen who have flown this ship cite its sensitive response to controls, its stability, speed and rate of climb.

News Notes . . .

A new twin-engine amphibian, designed and built by Meredith Wardle, of Silverside Heights, Wilmington, Delaware, is completing its first set of flight tests. This amphibian is powered by two 125-hp Lycoming engines, has gross weight of 3,600 pounds and 1,400-pound useful load, and can be adapted for either four or six places. Cruising speed is said to be between 125 and 130 mph at 75 per cent of power at sea level, and it is reported to have a landing speed of 50 mph. On a production basis this amphib may sell for $15,000 or $18,000, according to the estimates of its designer-builder Wardle. Mr. Wardle formerly was an engineer for Curtiss-Wright and Bellanca Aircraft.

RCA has announced that its new 9-pound radio transceiver is available. Its official number is transceiver 116.

The National Advisory Committee on Aeronautics' experiments have proved that the noise level of airliners and corporate executive transports can be reduced to the level of an automobile. Multi-bladed props, exhaust mufflers and reduction gears to cut down engine RPM reduce noise decibel ratings substantially.

The Ford Motor Co., of Detroit, Michigan, has taken delivery of a Douglas A-26 *Invader* converted to a luxury executive transport by the Grand Central Airport Co., Glendale, Calif. The former bomber is painted royal blue and grey with cream trim. It seats eight on divan-type seats, and is equipped with buffet, work table, plane-to-ground radio-telephone and other facilities for executives of the Ford Motor Co. The ship is being flown by Ford chief pilot Paul J. Kanoit.

TWIN-BEECH is owned and operated for executive business flights by the B. F. Goodrich Co.

Let's Federalize ANG

(Continued from page 15)

violation of our security. I am distinguishing between the ground components of the National Guard and the air components when I say that the time has come to federalize the Air National Guard and place it under the Territorial Defense Command of the National Military Establishment.

In the report of the Congressional Aviation Policy Board, the Combat Subcommittee, of which I was Chairman, made several important recommendations respecting the Territorial Defense Command. These recommendations stated: 1) "There should be established a joint task group designed to withstand an initial attack directed at the United States, and to form the basic organization for a strong territorial defense. 2) A competent aircraft warning network should be established under the direction and control of the proposed Command. 3) A realistic program of recruiting and training air reserve personnel in both air and ground echelons should be developed."

In justification of these recommendations, the Board noted: "Defense plans must contemplate an aggressive attack designed to cripple our centers of war potential. In the current atomic age, it may be expected that such attacks upon the United States will be delivered with little or no warning. Now is the time to organize the internal defenses in order to localize and repel such an attack. It is imperative that an air warning network be extended in all directions from which an attack may be expected. With regard to manning these defenses, at the end of World War II there was an enormous reservoir of highly skilled, well-trained flight and ground personnel. Only a fraction of that number is receiving training and practice in the reserve force today. Even this small force is in danger of disintegration due to lack of sustained training programs while the 'unorganized' personnel is rapidly deteriorating through total lack of training. Hence, we are facing a dangerous situation which threatens effective mobilization and makes planning exceedingly difficult. It will be necessary to provide an equitable system of Reserve retirements which may be earned by sustained participation in training programs. The best qualified personnel of the Regular establishments should be assigned to duty with these civilian components."

With these facts in mind, the importance of utilizing our National Guard forces to the best advantage becomes clear. There is urgent need for retraining of the ground units of the various State National Guard divisions for defense in depth. The air units, which have very little purpose in connection with internal problems a governor is called upon to solve within his state, should be converted into a highly mobile force unhampered by artificial lines on the map. Under control of the Territorial Defense Command, it would become immediately such a mobile force supporting regular Air Force units which could be directed as needed to intercept hostile aircraft whose approach has been disclosed by the early warning network. Lack of integrated command at such a moment of national peril would be fatal.

The second point in this over-all defense plan is the establishment of the Federal Airways Service as a separate branch under the Civil Aeronautics Administration in peacetime, but with its facilities coordinated with the early warning network under control of the Territorial Defense Command. The Airways should be made to serve the most useful purpose in time of tranquility by providing service to all aircraft in flight without specific limitation. This would be the most economical way of maintaining a large portion of the early warning network and of developing skilled operators and maintenance crews for an emergency. The radar equipment of the Airways and the warning network, properly coordinated, will be capable of doing useful work in traffic control and as aids to landing.

In their respective fields, the Navy and the Coast Guard should also have special units under the Territorial Command for these same early warning and defense purposes. They should include radar-equipped submarines, the air navigation facilities now operated by the Coast

(Continued on page 40)

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Let's Federalize ANG

(Continued from page 39)

Guard, the Direction Finding network and other facilities, including air search and rescue organizations.

The Air National Guard has made very considerable progress in organization and training within the past two years and this organization is to be complete by the end of the current year. It is the best of our reserve organizations for territorial defense because it comes the closest to the regular service in training and equipment. However, there is still much that needs to be done to make it fully effective and to bring it to full authorized strength in personnel.

To quote Col. W. A. R. Robertson, Chief of the Aviation Group, National Guard Bureau: "The Air National Guard actually began its existence on October 13, 1945, when the Secretary of War approved policies for the establishment of a new National Guard with a mission far exceeding any that it had ever held in its history. Until that time the air arm of the National Guard was nothing more than a token force, ill-equipped and undermanned. Prior to World War II, the air arm of the Guard consisted of only 29 Observation Squadrons, which were swept into the Armed Forces in 1940. We are proud of the fact that Air Guardsmen participated in every major aerial effort of that war. In addition, many Guardsmen from ground units went into Aviation Cadet and gunnery training, and the might of the Army Air Force which pounded the enemy to the verge of submission had a good leavening of Guard personnel.

"After the war, we of the new Aviation Group realized that we needed an air force equipped with the latest and best planes, manned by adequate numbers of properly trained personnel, in such a state of readiness as to be able to go into action on a moment's notice.

"Our first big task was organization. Without any previous framework around which to build, we started literally from scratch. The directive was that every state should have air representation of some kind within its boundaries, and experience has shown that we could plan on a basis of one flying officer for every 1,000 population in a state. Our next step was to get units located by states. We offered an Air Force plan to provide each State with those units which we thought would be most needed for their area, and without exception, the States accepted the allocations as we had offered them."

Federal recognition comes only after a State has accepted an allocated unit and has requested permission for its organization by a given date. If approval is received from the Department of the Air Force, the State then has two months in which to ask for USAF inspection of its unit site, facilities, personnel and general qualifications. If the inspection proves that the unit is up to required standards, then approval goes through the Air Force of the territory in which it is located, to the Air Defense Command (Territorial Defense) and finally to the Commanding General of the USAF. If all the requirements have been met, approval is signified and the Chief of the National Guard Bureau issues Federal recognition to the unit. The Federal government then assumes responsibility for 75 per cent of the operational cost and maintenance needs, supplying aircraft, uniforms, equipment and all training pay. The State assumes responsibility for the other 25 per cent and continues procurement of personnel from among its citizens.

There have been a great many difficult organizational problems, especially in getting proper air bases for location of units which will meet the two desired points Col. Robertson named. Many excellent air fields had to be by-passed because they were too far from center of population, and competition for properly located bases was keen, since they were also desired by airlines, reserve components and private flying schools. However, in the two years intervening, real progress has been made. Five hundred and fourteen ANG units have been authorized for all the States, the District of Columbia, Puerto Rico and the Territory of Hawaii; 384 have received Federal recognition and 52 more are in the process of organization. By the end of the present year, all units should have received Federal recognition. When the ANG reaches total authorized strength, there will be 57,946 personnel in 12 wings, including 24 fighter groups, three light-bombardment groups with supporting units, and the two overseas fighter squadrons mentioned. The 24 fighter groups will contain 72 fighter squadrons and the three light-bombardment groups have 12 light-bombardment squadrons. Each type of squadron will be supported by an Air Service Detachment.

Current equipment of the units consists of North American F-51's and Republic F-47's for the fighters and Douglas B-26's (formerly A-26's) and North American B-25's for the light bombers. As soon as suitable bases for jet operation are available to the Guard, full conversion to jet aircraft will take place. Twelve F-80's are now ready for flyaway at the Lockheed factory, and four of the fighter groups are now being converted to these planes.

Special funds are allocated by the Air Force for procurement of ANG aircraft and only plane types which are in operational use with the regular Air Force are bought for the Guard. They must have a minimum of one year's service testing before they are issued to the Guard.

There is a present shortage of flight surgeons and trained radar technicians and civilians have had to be borrowed from commercial radio companies as instructors. There are plenty of World War II pilots available now, but the age limits are rapidly catching up with them. The top limit for jet pilots is 32 years. Flying safety has been another problem, since too many of the pilots have not been aware of the characteristics of fast, modern aircraft. The Guard is doing everything possible to emphasize safe flight.

The present limit of 110 hours of flying time a year per pilot is too low. There are also not enough permanent personnel authorized for maintenance.

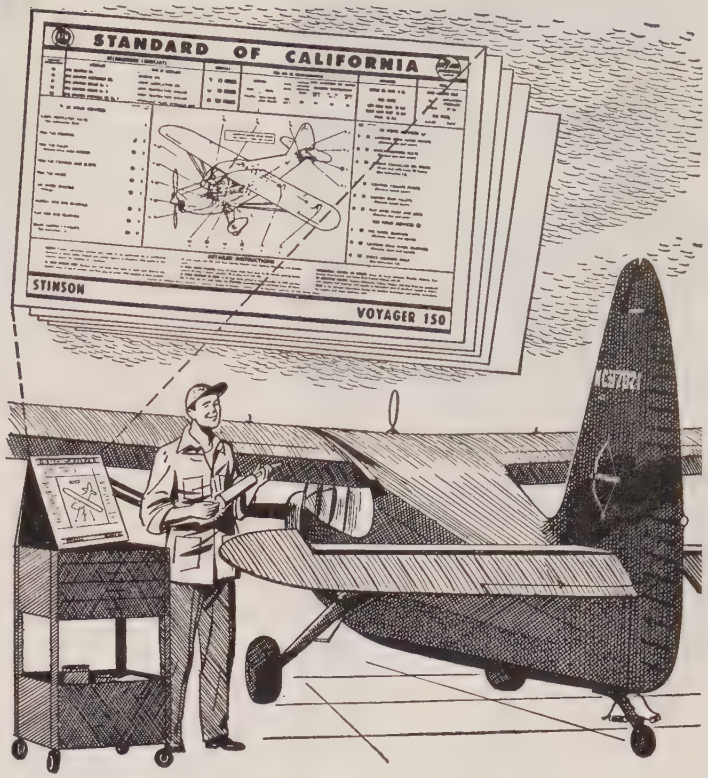
It seems obvious from these facts that the Air National Guard is a vital potential asset to the defense of the United States proper, but much still remains to be done to make it the full strength, integrated air arm which we will need in case of hostile attack. I can see no good reason for the States to object to its complete Federalization, since the safety of all states is involved. Certainly, integration with the Air Force would provide unity of command, better opportunity to equip and man the groups and to train them in close cooperation with regular Air Force Components. We cannot afford to gamble our national security against the politics of imaginary local boundaries lines. Enemy aircraft will not care whether a target point is in Massachusetts or Connecticut, so long as they can hit it with destructive force. Our defense should be as total as any attack may be total.

"George—how much does a wing tip cost?"

ADAMS

PLANE FAX

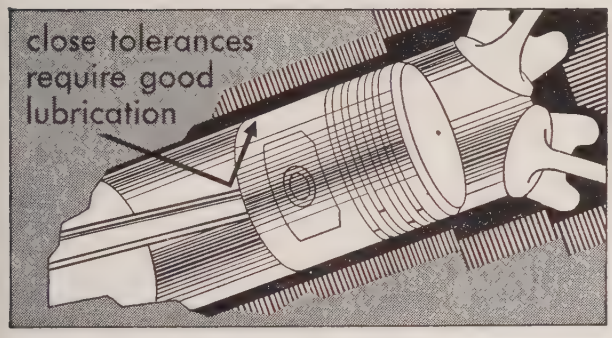
A page of service tips for private flyers and fixed-base operators



Special charts assure "tailored" lubrication

So important are the lubricants you use for wheel bearings, landing gear and control system that Standard Airport Dealers follow specially designed lubrication charts. Drafted with the cooperation of aircraft manufacturers, these charts specify the proper lubricant for most efficient operation for personal planes. So let Standard Airport Dealers assure perfect "fit" of oils and greases for your plane's parts.

Thinned-out oil may starve engine parts



You probably know that when oil temperature goes dangerously high, the lubricant becomes dangerously thin. Oil that is too cold, on the other hand, will not circulate freely, may "starve" some parts and expose them to scoring. So it's a good policy first to learn the maximum and minimum oil temperature limits for your engine—and then select the proper grade of RPM Aviation Oil that will give best protection over a wide temperature range.

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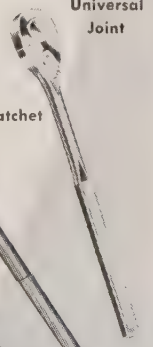

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Pilot's Report

(Continued from page 20)

able, Mr. Sloan pointed out that one could check everything in the cockpit in a couple of minutes by starting at the right side of the instrument panel and checking each operation in orderly sequence from right to left.

Probably the most unconventional feature of the Ryan *Navion* is the braking system. Pilots familiar with military and surplus planes will find it somewhat awkward to use the single brake handle that hangs below the center of the instrument panel. However, the brake operation becomes "second nature" with a little practice. The nose wheel, in turn, is steerable with the rudder pedals.

We were ushered through a warm-up check on this demonstration flight and then headed down the long runway at San Diego's Lindbergh Field. The *Navion* is one of the world's easiest planes to get into the air, but through occasional improper piloting, it has not built up a reputation for quick take-offs. The *Navion* will roll a long way down any runway—*if* you let it. But if a pilot will start on the control wheel as soon as the airspeed crosses 50 mph and snap the gear-up lever shortly after the plane breaks ground, take-off roll can be cut to a minimum.

The gear-up handle is tricky. Naturally such a mechanism must be designed so that it will not be moved accidentally on the ground, and the *Navion* has a safety latch under the edge of the instrument panel that must be flipped aside before the gear lever may be pulled up. It takes a little practice to get the hang of this gadget and many a first-time pilot has been well out of the traffic pattern with his gear still dragging. So if you've flown a *Navion* just once and walked away somewhat confused, try it again. The plane gets easier to handle with every flight.

Once out of the Lindbergh traffic pattern, Mr. Sloan demonstrated the surprising slow-flight characteristics of the *Navion*.

"I'd rather let down through an overcast in this plane," said "Doc" as he throttled back and pulled up the nose, "than to come down in a parachute. Look at the airplane slow up to 50 mph under partial power, 1500 to 1700 rpm, and see how slowly it settles. And look at the aileron control . . ."

Our check pilot rolled in full aileron and the docile airplane smoothly dropped a wing. There was no tendency to fall off in a spin. While the *Navion* has a complete set of conventional controls, it retains many of the non-spinning characteristics of the *Ercoupe*.

We flew over to an abandoned Navy flight strip and shot a half-dozen landings. It is practically impossible to make a bad landing in the *Navion* for the rugged, broad-of-beam landing gear will take care of just about all the boners in the book. And the flaps—wonderful! Gear and flap speed is 100 mph, and you can retain as much altitude as you wish in the traffic pattern. When you turn on your final landing approach and drop the flaps, the *Navion* arches its back like a cat sighting a dog and heads downstairs in a rush. Again, this steep approach angle with full flaps is something new for a non-*Navion* pilot to learn. On our first two attempts, we had to add power to make the field. Actually, a method of stopping the flaps half-way down would be advantageous at times. The flaps can be pre-set before take-off, but we found that they would eventually creep away from any position other than full up or full down.

After receiving Sloan's blessing, we signed a single acceptance slip for the new green *Navion* and headed for Los Angeles. The day was a credit to the local Chamber of Commerce—warm, sunshiny and a few scattered puffy clouds. We flew up the beautiful sandy coastline at 2,000 feet and were just beginning to relax and feel at home in the new plane when something went wrong. The *Navion* started to vibrate as though a propeller blade had come off. We instinctively squared away on the broad beach as we made a quick run-down of the yet-unfamiliar switches and levers in the cockpit. After pulling about everything in sight, we got to the carburetor heat and the vibration ceased. The pilot's operational manual stresses the merits of the "non-icing" carburetor, but that is mostly myth. In icing conditions, the *Navion* will ice-up just like any other airplane. By using generous portions of heat whenever there was a cloud in sight at our flight level, the *Navion* didn't miss another beat all the way East.

At Los Angeles we picked up two more passengers and at least a full load, 180 pounds, of baggage. With full tanks, we started East from the pint-sized Monrovia Airport. It appeared that someone had taken a fully-loaded *Navion* from this 2700-foot strip (tall trees at the far end, of course!) about a week before and had dusted the tree-tops going by. Most of the instructors and students came out of the flight shack to watch our take-off after noticing the liberal amount of baggage we had stuffed aboard. Find confidence maneuver for a fellow's first take-off with a full load!

We taxied far up in the corner of the field, dropped half flaps to increase lift, eased in full throttle and climbed off the brakes. The *Navion* accelerated quickly and we hopped into the air not more than a third of the way down the runway. The gear was all the way up and we were coming back on the power as we crossed the trees at the end of the field. No doubt the former *Navion* pilot had just let his plane roll too far before picking it into the air. We climbed to 9,000 feet at 500 feet-per-minute on 2300 rpm.

The smooth flight to Phoenix was one of those things that pilots always hope for and seldom find. There wasn't a bump in the sky and the late afternoon sun was at our tail. With a bungee spring linkage between the rudder and the ailerons, the *Navion* can be flown cross-country with only the rudders or only the wheel, depending on the preference of the pilot. We took two hours and 36 minutes for the 345 miles in almost calm air. That's 135 mph with a full load and "babying"

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Labor Day Pilot

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Thompson Trophy race is a big thing for him, therefore, he goes from one year to the next thinking of it.

In 1947, the first year in which he competed, Puckett was flying in second place around the Cleveland closed course when, on the 19th lap—just one and a half laps from the finish, he developed engine trouble and was forced to make a dead stick landing.

It was a bad break for the ex-Navy flyer, but he has washed the incident off as experience and this year will be trying harder than ever to get the victory which he came so close to attaining last year.

The Thompson Trophy "R" division ("R" for reciprocating engine) which Ron enters is the last event of the Cleveland Air Races. These include cross-country speed contests, light-plane closed-course races and handicap races of numerous assortment. From a spectator's standpoint, the Thompson is the greatest race of all, for it provides more speed, more turns and full visual following for the spectators.

For the pilot, the "R" division event is a difficult affair. He must make 80 tight turns around the 4-pylon quadrangle during his 20 laps. The quadrangle is 15 miles in perimeter and the total distance travelled is 300 miles. Even in light-planes, such maneuvering would be difficult, but in the hot fighter aircraft which all competitors now use, the course calls for the most precise pilot skill. Many of the planes have been radically altered to afford greater speed and this makes the tight turns around the pylons even more hazardous aerobatics.

Puckett, like all contestants, stakes a lot on victory. To even be counted as a contender, a pilot must have a plane of the caliber of fighter aircraft with which the U. S. won the war. Although most of the pilots picked up some of these craft at surplus sales and got them dirt cheap, relatively speaking, a Thompson Trophy entry involves the expenditure of much money.

And the chances of winning are slim. The country's hottest pilots participate. Last year, of 32 pilots who competed, only 12 were qualified for the finals and only six of that number finished. One pilot, flying an F2G like Puckett's, was killed in a crash.

The stakes, naturally, are high. The winner (last year was "Cookie" Cleland, a flight service operator from Cleveland) gets $16,000 plus $2,000 if he breaks the existing record. Those who place receive sums ranging down to $1,000. Lap awards of $100 are also offered. In addition, the winner is subject to reimbursement by the manufacturers for indorsing the fuel and accessory products as well as the plane he uses. All in all, a man could live well from year to year on the money he would make as perennial possessor of the Thompson Trophy.

The trouble and risk an entrant goes to, particularly someone in such a position as Puckett, makes the awards little more than deserving.

In 1947, March 15 to be exact, when Ron was released from active duty he purchased an F2G for $1,500 at the Naval Air Station, Patuxent, Md., where he had been a test pilot prior to return to inactive duty. On his terminal leave, Puckett worked on the plane at his home in Kansas City. There, he souped up the engine, fared the exhaust stacks alongside the cockpit and built a gasoline tank into a slot behind the seat.

This last measure was necessary because of the high rate of fuel consumption which his souped-up plane has, and it was, as you will see, Puckett's foresight in doing this that enabled him to qualify for the finals of the race. Ron estimates that at best power setting consumption runs 440 gallons per hour. There must, therefore, be auxiliary tanks to hold extra gas for the 20 laps.

On Monday preceding Labor Lay, Puckett flew to Cleveland. En route he encountered a thunderstorm and had to fly through it due to his gas shortage. The fury of the storm whipped the paint off the leading edge of the wings and, worst of all, shook up the plane until Ron lost his hydraulic pressure. When he reached Cleveland, Ron was unable to get his landing gear down by normal procedures. Only by popping his CO_2 bottle and simultaneously performing a snap-roll was he able to get the wheels down.

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Pilot's Report

(Continued from page 42)

a new engine. The ship had no manifold gauge, so we cruised at just under 2100 rpm with the throttle nearly two inches back from the stops. According to Ryan officials, next year's plane will include a much-needed manifold pressure gauge.

Many months of the year, the Skyharbor Airport in Phoenix is the busiest airport in the country. In spite of the heavy traffic, however, service is very good. As soon as the control tower clears you off the ramp, a service man waves you to a tie-down spot and your plane is serviced while a cab is on its way to the field.

Our next stop was at Tucson, Arizona, where we landed on the sod Desert Skylodge Airport as a strong dust-devil traveled across the runway. The *Navion* showed no tendency to want to go back into the air in this hot, gusty crosswind. Actually, crosswinds on the ground all but cease to be a problem in the *Navion.*

After loafing for a day in the Arizona sunshine, we decided that it was time to put some miles on the airplane. We made a fairly early take-off from Tucson and headed northeast toward Albuquerque, New Mexico, to miss some questionable weather. On the map this hop looks very desolate, but in flight there was always some sort of a road within gliding range from 9,000 feet.

Kirtland Airport at Albuquerque was the highest spot we hit on the entire trip, 5,330 feet. We were forced to land short behind an *Ercoupe* on the 10,200-foot runway and so had to taxi over a mile to the airline ramp for fuel. The *Navion* handles on the ground just as nicely as it does in the air and it is easy for a pilot to taxi too fast. Our air speed hovered at 40 mph during most of this ground roll.

The ship hopped back into the air with a very short run at Albuquerque and we ridge-soared over the nearby 10,695-foot San Diego peak, taking advantage of the rising air currents on the west (upwind) side of the slope. Local pilots strongly advised clearing the peaks by at least 2,000 feet since strong downdrafts are normally encountered on the downwind (east) side of the range. Aided by the rising winds, we indicated 12,000 feet just 10 minutes after take-off.

As the morning progressed toward noon, scattered cumulus clouds began to litter the airway over Tucumcari, New Mexico. We called the radio range station, reported our position, and complained about the turbulence along their rough airway.

"Sorry," replied the man behind the mike, "but we cain't hep it." We knew we were nearing Texas.

In rough-ish air, the *Navion* does a minimum of bouncing around. There is absolutely no visible flexing in the heavy wing structure and the plane may be kept on course without touching the rudders. There is very little tendency to yaw when a wing is picked up with aileron alone. This restful control touch is most important on long cross-country flights, and after flying six hours and 20 minutes in this one day, there was little or no pilot fatigue.

We went into Amarillo, Texas, where a mile-high layer of blowing dust cut visibility to three miles. The English Field control tower reported winds 45 mph as we called in over town, but the *Navion* stayed on the ground easily following a no-flap high-speed landing from a 100-mph approach. The windshield was covered with a grimy layer of dust and propeller grease and the runway numbers, blackened from the tire marks of innumerable transports, were almost impossible to read.

Our main complaint throughout this trip was this propeller grease, Apparently the Hartzell propeller on this particular plane had some minor imperfection in workmanship or installation and we had increasing layers of grease after each landing. Mechanics who checked the prop said that no damage would be done by continued flying, so rather than authorize lengthy repairs, we continued to fly, grease and all. The prop functioned perfectly, but grease seals were replaced after we delivered the plane. Subsequently the Ryan factory advised that "Hartzell is now working on a further design which is expected to virtually eliminate the oil-throwing problem."

Fastest hop on the whole trip was from Amarillo to Wichita, Kansas. This 305-mile leg was made in an hour and 49 minutes atop a heavy 9,000-foot layer of Texas dust blowing into Kansas. Ground speed was 168 mph but we were aided by a substantial tailwind. Winds at Wichita were "up to 50 mph" when we called in for landing instructions. The tower operator immediately asked the type of aircraft and sounded much relieved when we replied *"Navion."* We had burned 18 gallons of gas on this last high-speed hop.

Navigation over this flat farm country is surprisingly simple in a radio-equipped plane. Frequent range stations dot the airways and radio communication is not impaired by mountain ridges. While radio speakers have been added to the latest models, NC-4241K was equipped with a head-set and after a full day along the airways, we had one very sore ear.

From Wichita we wandered North on a rubber-necking tour through Minnesota to miss some nasty weather and spend one night at Rochester's neat, close-to-town field. Here not only our windshield but the whole front of the airplane was wiped free of grease. Normally, however, we had to ask to have the windshield wiped even though it plainly showed the need of it—and our gas bills averaged up to $10 per hop. Most airport operators still have a lot to learn from service station owners.

From Minnesota, we headed for Chicago and caught up with one of the many storm fronts in the area. We were flying on airways over the Rockford, Illinois, range station as the man behind the mike said, "visibility 3 miles, ceiling 6,000 feet and light rain."

About two minutes later we radioed from over town and asked if anything stuck up higher than 500 feet. The rain was coming down in a solid sheet and

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Labor Day Pilot

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On landing, Ron tried to get jacks by which to raise his plane in order to repair the hydraulic trouble. It would have been impossible to even qualify, much less compete in the finals, with the wheels down on his ship, so the need for repair was a great one. Thus, on finding no suitable jacks at Cleveland, Puckett took off once again and flew, wheels down, to Columbus, Ohio, where he borrowed some jacks from Bill Sweet, a flight service operator there. Some Naval Reserve mechanics, off-duty from the Reserve station at Columbus, helped ex-Navy pilot Puckett repair the hydraulic leak.

After completing the repair work on Thursday, Ron returned to Cleveland feeling that all his bad luck was behind him. This feeling of optimism was even stronger the night he test-hopped the plane preparatory to making qualifying runs the day before the race. The plane ran smooth, Puckett felt fine and the weather was good. What could go wrong?

Ron found out the next morning. As he landed to get his position in the qualifying run after making the mandatory warm-up flight, Ron discovered his electric fuel pump was shot. With less than three hours in which to qualify, there was no time to install a new pump, even if he could find one. Frantically, he searched for a starting unit and finally found someone with a battery and generator who helped him get his engine going.

Not troubled enough by the worry of having to replace the pump should he qualify, Ron discovered just before he taxied out that he didn't have enough gas to cover the two laps necessary to qualify. He called Verne Bifford, a Marine Corps sergeant who had taken leave in order to be mechanic for his friend Puckett, and asked Verne to page a gas truck.

Despite Verne's repeated pleas, no gas truck would approach the plane until Ron switched off the engine. Fearing he might not be able to start it again due to the ailing pump, Ron had Bifford sit in the cockpit and personally went out to plead for service.

Not until he had gotten the okay of field, race and fire-fighting officials would the operators fill his plane—and then they would not have done so had the gas been placed in a wing tank. The danger of fire, so prevalent in filling wing tanks, was not considered as great in filling the tank which Puckett had placed behind the seat. His foresight in installing that tank really paid off.

When Puckett took off, the load factor was, due to the weight behind him, far from that for which the plane had been designed. Nevertheless, Puckett whipped the F2G twice around the 15-mile course in an average speed of 375 mph and qualified for the finals with the fourth fastest time.

As soon as Ron landed, he and Bifford started to work installing a new fuel pump. They got one from the Thompson Oil people, sponsors of the race, but they were faced with the problem of putting it on themselves. "We were just about up the creek for good," said Ron. "No tools—nothing but a pair of scissors, so that's what we used." They did borrow a couple of wrenches from Tony LeVier, who had also qualified in the same event. Explaining Tony's generosity in loaning tools to his own competition, Puckett says, "Well, you see, Tony didn't happen to be around when we borrowed the wrenches."

The two men worked on the ship that night, aided by some of the mechs from Columbus who had taken three-day passes to come to Cleveland and help Ron. When at last the new pump was in, Ron ran the plane on the ground and checked for his best power settings. To do so, he first checked the outside temperature to make sure it would be about the same as forecast for the next day. Then he poured the gas to the engine and let it accelerate until a blue flame showed from the exhaust. When the exhaust flame was its brightest blue, Ron marked the throttle quadrant at that seting and shut off the engine. Then he went to bed.

That's not saying he slept. He tossed and turned, but the excitement pending on his arising made him feel as rested as if he'd had 12 hours sleep. Puckett had the jitters that are customary to a first-time entrant in the National's famed Thompson race, but he also had the egotism of a newcomer.

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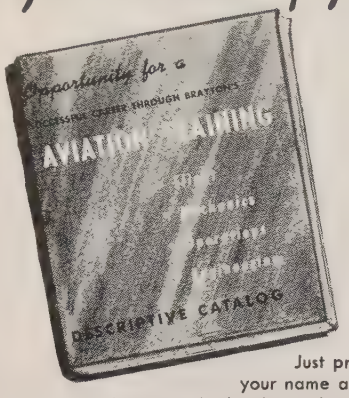

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Labor Day Pilot

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Surely, he thought, everything that could break against him had done so. But fate deemed otherwise. The worst, the very worst was yet to come.

Due to his limited fuel capacity, Puckett had requested that an auxiliary starting unit be at the starting line in order that he not have to start on the parking line and use up gas in taxiing. His request approved and a promise that the unit would be on hand having been easily obtained, Ron had a tractor tow him out to the starting line.

The rest of the contestants taxied out to the take-off spot and lined up. The time for the beginning of the race came but no starting unit was available. The starter waved his flag and 11 planes roared down the mat. The 12th, with Puckett in the cockpit, stood still—very still. Puckett was busy, however. Frantically he waved to some Chance-Vought mechanics who got a starter and hustled it out to the plane.

When the engine caught, Ron didn't wait for a warm-up. Instead, he poured on the coal and hurried down the mat. As his wheels cleared the ground, he looked and saw LeVier in his P-38 already a mile on the second lap. LeVier averaged 2:20 for each lap, so Ron figures he was two and a half minutes late taking off as a result of the lack of a starter.

Ron spent the first four laps catching up. On the fourth lap, at the Number 2 pylon, he pulled abreast of LeVier in his "38," Skip Ziegler (who later in the race bailed from his P-40) and another contestant in a P-36. On the Number 3 pylon of the fifth lap, Puckett went past all three and mentally pocketed the $300 lap money he had made.

The leaders were far ahead, however. It wasn't until the 15th lap that Ron pulled up to Becker in an F2G with which he finished second and Jay Demming in a P-39. For three laps, the planes raced together. Then on the 18th lap, Puckett, pulling over 40 inches of manifold pressure, surged into second place.

Still intent on catching Cleland, who was leading in another F2G, Ron was not conscious that his engine was anywhere near the trouble it encountered on the 19th lap. The blast which took off the scoop and the intake couplings on eight cylinders occurred when he was making 410 mph. As soon as it happened, Ron chopped the throttle, and his hopes, victory and the plane descended onto the North-South runway of the Cleveland field.

It is questionable whether Ron could have caught Cleland even if his engine had held out. But he insists he has the best plane and that he could have done it. He believes it so much that he definitely predicts a different ending this year—one in his favor.

Following the races last year, Puckett took the $1,200 he won as lap money and consolation prize and left the plane at Cleveland with a friend, Shorty Heafner, who turned the engine up once a week to keep it in shape. In January of this year, a couple of important things happened to Ron. He moved from Kansas City to Washington and with him he brought a new bride.

In April he went to Cleveland, picked up the plane and brought it back to Washington. En route he encountered another thunderstorm and, to navigate safely through it, he cut his throttle settings back and joined up on a Beechcraft 18 which was headed for Washington. The thunderstorm beat the plane up a little bit, but did no excessive damage as had occurred on the way to Cleveland last year. "Taking a trip in that plane," Ron explained, "is just like taking a tumble down the stairs." But for the prohibitive cost, Ron might have it shipped, rather than fly it to Cleveland for the races.

In Washington Ron ran unto luck. Trans-World Airlines made room in their hangar at Washington National for the plane and Ron found a financial and engineering guide in Dave Fulton, a TWA pilot. Fulton, who tried in the 1947 Thompson Trophy event, but failed to qualify, put into Ron's F2G what he had received from the sale of the ex-Army P-51 which he used last year.

Any evening Fulton is not making an international flight for TWA, you can find him and Ron working on the converted *Corsair*. Ron ordered a new propeller from the Hamilton Standard Company and the two have been busy installing and testing that as well as fairing the wing flaps into the wings and reducing the size of the tail. Lately, while Ron and Dave have been souping up the engine seeking to attain a rated 3,000 hp, Ron's pretty wife, Betty, has been shining the diminished tail section.

The trio and the airplane will be heading out to Cleveland the last week in August, some 300 man-and woman-hours wrapped up in the converted *Corsair*. Ron will go through the same qualifying procedure and, he hopes, the race on Labor Day. This year, however—well, they've just got to win because Ron, who along with his wife will get plenty of recompense for his labors through the glory of winning, has promised great interest on Dave's investment of money, advice and labor.

"Betty and I will take the cash and the headlines," says Ron. "We've promised Dave the Trophy."

New AF Designations

USAF has announced redesignation of several types of aircraft. Under the new designations "F" is for Fighter; "R" for Reconnaissance; "T" for Trainer; "S" for Search and Rescue; "X" for Research; "A" for Amphibian; and "H" for Helicopter. Other designations remain unchanged: "B" for Bomber; "C" for Cargo; "G" for Glider; "L" for Liaison; and "T" for Target or Drone.

Navy's Pirate

(Continued from page 23)

Pirate began in the Fall of 1944 when BuAer approved the first design of the plane and set the contract requirements. By the time the prototype flew at Muroc Air Force Base in October, 1946, jet advancements had outdistanced several of the Navy requirements. Newer, improved design details were already coming off the boards at Stratford, Connecticut, while at the Solar Aircraft Company plant in San Diego, California, development work had begun on a thrust augmentation device for use with jet planes, a device which would generate added thrust in the tailpipe.

The original XF6U-1 was brought up to Stratford from the Patuxent River Naval Air Station where testing had been continuous during 1947. Early this year an entirely new tail section, incorporating the afterburner and a new stabilizer configuration, was installed. During April of this year the newly converted X was flown, and its performance, according to modest report, fully justified the Chance Vought-Solar-BuAer experimental work.

Before the design change-over the *Pirate* had been announced as being 11 feet, nine inches high; 32 feet, 10 inches long; with a wing span of 30 feet, two inches. New dimensions have not been announced, but they are believed to be still approximately the same for the five-ton aircraft. Within the new cigar-shaped fuselage aft of the wings are included the 10-foot length of the J-34 Westinghouse 24C axial-flow turbojet and an additional eight feet of self-contained afterburner installation.

The Westinghouse jet engine has an over-all diameter of 27 inches and it includes 11 axial compressor stages with one direct-flow, double-annulus combustion chamber. The 1,200-pound engine delivers 3,000 pounds of thrust at sea level under standard conditions.

The afterburner is something new. According to Solar "it adds little weight to the airplane and is not complicated." One of the handicaps found in jets is that thrust power might be raised considerably were it not for the temperature limitations imposed by the construction and rotating speeds of the turbine wheels. With a method of burning fuel with unconsumed oxygen *after* it passes the turbine, temperatures and thrust may be increased safely. The Solar afterburner, whose principal part resembles an over-sized gas stove burner, injects fuel into the tail pipe to burn with the oxygen, increasing the effective thrust of the *Pirate* as much as 50 per cent under certain conditions.

Because of the wide variance in jet thrust velocities at different speeds, it also was necessary to develop a variable nozzle to change the tailpipe exit diameter in flight. The two moving sections which do this job have already been dubbed "eyelids" as an indication of their type of movement, wide open with the afterburner working and closed down somewhat for the jet alone. Other extras which are

(Continued on page 49)

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Pilot's Report

(Continued from page 44)

visibility was a scant half-mile. We did a quick 180° turn and headed back to the airport. In spite of the heavy rain, the *Navion* didn't leak a drop, but radio reception was badly impaired by static.

After "sweating out" the weather for more than an hour, we again took off for Chicago. The farther we went, the worse became the weather, and we finally "dripped" into the Pal-Waukee Airport, 23 miles northwest of the Windy City. The weather was so poor that we stayed overnight in one of three pilot's rooms at Carl Rupert's parachute loft across the street from the airport. This was the only airport in the 22 we hit that had any overnight accommodations on the field.

The next day we caught up with the same storm again and made our first landing at Marion, Indiana, where the soggy, grass-covered Westside Airport looked more like a lake than a flying field. After making two low passes to be sure that the field was safe, we landed tail-low in the mud and held the nose-wheel off until the plane was almost stopped. There was no tendency on the part of the ship to nose-up.

After another check of the weather sequences, we headed for Columbus, Ohio. The take-off from this dripping airport was quite interesting. Local pilots advised a tail-low take-off to minimize the chance of nosing over in the mud. After dropping half-flaps to shorten the roll, we eased in full throttle with the wheel held all the way back. The prop threw a misty circle of vaporized moisture as we began to roll and the nose wheel immediately left the mud. While the take-off was longer than from a dry airport, the *Navion* staggered into the air with the tail skid almost dragging after a respectably short roll. Once the wheels were free of the mud, the plane picked up speed quickly and we flew through intermittent rain squalls into Columbus, Ohio.

Again the next day we had to buck the storm front that had continued eastward while we slept. We took off hurriedly from Columbus as a huge thunderhead formed over the airport, and plowed through the rain to Wheeling, West Virginia, where a spacious and neat hill-top airport serves wonderful home-made pie and pastries.

We had hoped to deliver the plane in a short day's flight from Columbus, but weather wouldn't permit it. By staying "on the deck," and navigating primarily by the radio range, we were able to sneak into Pittsburgh's busy Allegheny Airport. The tower operator cleared us for a straight-in approach when we called in over the range towers while a DC-4 was on its base-leg. We had just enough time to cut the power, drop the gear and flaps, flare-out and land. The green gear safe-light came on just before we crossed the airport fence.

After another overnight stop, we checked the still-dubious weather and decided to take off in mid-afternoon with hopes that the solid overcast along the Atlantic coastline would dissipate. Should the eastern weather remain "socked in," we could always land at Altoona, Pennsylvania, and spend the night there. Insurance restrictions on this ferry flight read "no night and no instrument flight," so we either had to stay under the weather or stay on the ground.

From Altoona we dropped down under a thousand-foot ceiling and cruised over the winding gorge of the Susquehanna River into Harrisburg as the overcast was breaking up. After a final weather delay, we were able to sneak into our destination where Mr. Harding Breithaupt of Reading Aviation accepted his new airplane.

The *Navion* is justly popular because it is rugged, easy to fly, has no bad flying characteristics and is reasonably fast. Visibility is tops; more like the new Studebaker than anything in the air. Pilot comfort is far above average with plenty of leg room and comfortable seats.

Ryans Development

When *Ryan* took over the Navion project, 51,707 man-hours had been spent in experimental design and another 171,997 man-hours consumed in building 1,100 planes over a two-year period by North American. Ryan has made almost a dozen specific improvements beyond that, and any criticism of the airplane would be based on purely personal preference.

The reserve fuel pump on NC-4241K was electric and operated by a switch on the instrument panel. This switch needed an indicator light for it was too easy to take-off and then forget to turn off the fuel-boost pump.

The much-needed radio speaker also has been added to current models.

The baggage compartment can not be fully opened in flight. While this modification is minor, it is frequently desirable to get coats, maps or cameras from the aft compartment in flight. Since a cabin heater is extra equipment, not included on NC-4241K, it would have been very convenient to have reached our coats in flight.

The mixture-control handle is placed near the carburetor heat control. While the mixture has a quarter-turn lock, it is conceivable for a pilot under stress to reach for the wrong knob and kill his engine with the idle cutoff from the mixture control.

Last on this list of trivialities is a complaint that will come only from pilots with big hands. The trim-tab wheel mounted directly below the throttle, is so close to the flap handle that a pilot with large mits frequently taxies up to the line with a skinned knuckle from hurried use of either flaps or trim.

No matter how you slice it, though, the Ryan *Navion* is rapidly becoming the old reliable in the four-place field. Best proof of the ship's continued popularity can be found in Ryan statistics showing a steady increase in production. Current volume is 3 to 3½ planes per working day with a steady monthly increase from one plane in November, 1947, to 16, 23, 37, 41 and finally 53 planes in April, 1948. So the airplane must be good.

That nifty *Navion* is a joy to fly. If you doubt it, listen to the bragging owners —there are plenty of 'em.

Navy's Pirate

(Continued from page 47)

part of the Solar device are an electrically operated fuel control which automatically regulates the burner, a nozzle actuator, an afterburning fuel pump and an igniter.

Despite the high temperatures being developed in the tailpipe there have been no failures in the cooling air system or the tailpipe shielding. The unusual stripes under the horizontal stabilizer which are seen in some photos of the new X-*Pirate* are test strips of heat-resistant paint to determine the best type for the new stainless steel fuselage extension.

The addition of the Solar device complicates engine removal slightly, but it's a complication worthwhile. Instead of the aft fuselage coming away to allow removal of the engine, the *Pirate* has a belly hatch which is opened to allow the Westinghouse engine to be dropped straight down. As soon as it is out of the way, runners are put into place and the afterburner slides forward to drop through the same opening. Replacement is exactly the opposite, but despite the added factors, engine and afterburner removal and replacement are believed to add only 10 minutes to the operation formerly necessary with the engine alone, with the total time still comparable to maintenance operations on other types of jets.

Several considerations resulted in the new tail surface design. The dorsal fin was added largely because of new strength requirements due to the fuselage extension for housing the afterburner, while the "torpedo"-type stabilizer fairings now used at the tail surface junctions add strength and improve control. The fairings are reminiscent of the "acorn"-type first used on the British Westland *Whirlwind* during the war.

Indicative of the complications that have grown through advances in aircraft design and production are the three XF6U-1's Chance Vought has flying test for the Navy. The original is now the afterburner test plane, another is a fully instrumented plane for high-speed experimentation while a third is used to test dive-brake installations. The continuing test reports have not only resulted in the change in the tail design but the production *Pirate* includes a fuselage dive brake similiar to that already in service on the Douglas AD-1 *Skyraider* (one door on each side of the aft fuselage) and deep trailing edge wing fillets were added to the wing area to improve stability and airflow.

Behind the development of the installations on the production model are the efforts of many ideas, talents and minds. At the top level the *Pirate* was evolved out of the efforts of about 175 people included in Chance Vought's design group headed by Project Engineer J. R. Clark. Soon after the plane was tested at Muroc, Clark moved over to head the Experimental Department and his place as *Pirate* Project Engineer was taken by his assistant, H. C. Nissen, who in turn is now assisted by E. J. Greenwood. While Clark has been working on secret new develop-

(Continued on page 51)

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Aviation's Whip

(Continued from page 28)

by NACA instruments and engineers.

Down in one corner of the Langley field laboratory, a pilot reports for work. His job is glamorous and easy—it says, for he is a test pilot. On any typical day this young man crawls into a cockpit and nonchalantly takes off a weird-looking supersonic craft which he has never seen before. Except for a couple of feminine assistants—better and better—there is no audience. This pilot is really good; he requires no checkout, no familiarization, and he doesn't even bother to glance through the operating manual. In fact there is no operating manual—yet. The pilot is a veteran of many crashes, but he has never gotten a scratch!

No, he isn't "super-pilot," but merely a guy with a "gimmick." The secret is that the plane he flies is by remote control. His cockpit is firmly attached to *terra firma.*

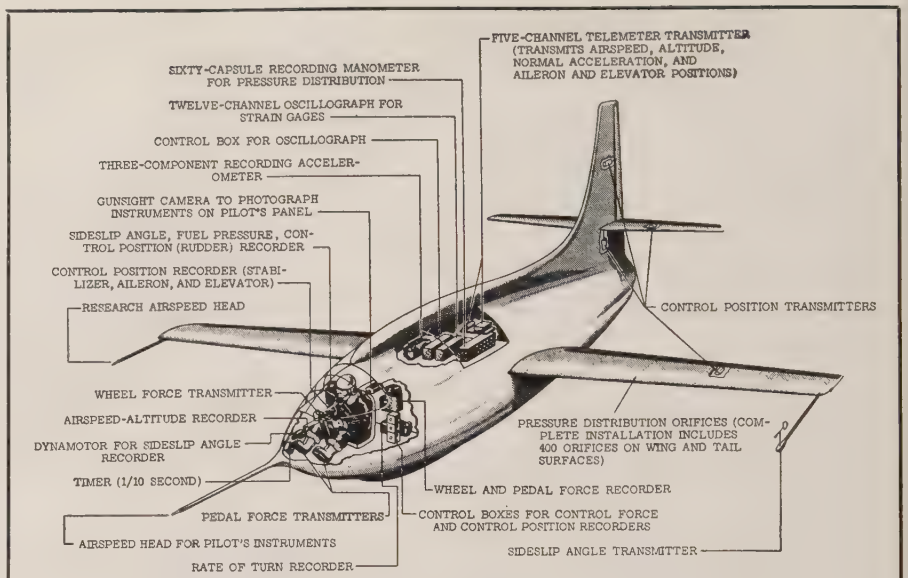
The planes are small flight models, exact to scale. The cockpit is located snug in the mouth of a huge wind tunnel. The tunnel is housed in a steel sphere some 60 feet in diameter, and is ingeniously mounted on bearings so it can be tilted through a wide range of angles to correspond up to a 30° glide angle, or a 30° climb angle.

Non-powered models fly in a constant glide, with the tunnel tilted down toward the air inlet end of the tunnel. Powered models fly toward the air inlet with varying degrees of up or down tilt, depending upon the speed of the model and the velocity of the air through the tunnel. High sub-sonic speeds can be simulated in this tunnel.

From the cockpit located in the floor of the tunnel near the outlet fan, the test pilot puts the little ship through its paces. In short order he can give the designer the "word" on whether it will or will not fly—and if not, why not.

The remote control system is electrical. Control power is transmitted from the cockpit to the plane through a pair of thin flexible wires, which are hooked up to electromagnets attached to the ailerons, rudder and elevator. These magnets are actuated by the pilot, through two very small three-way switches. From the small-scale model, data can be extracted that will apply to the full-scale plane up to near transonic speeds. When the tests are over and the report is in, the landing, take-off, stalling and critical flight speeds of the plane-to-be are already known.

Compare this method of quick inexpensive flight analysis of a new design with the way it used to work. In the old days, before a new airplane could be proved or disproved, a full-scale flying model had to be built by hand at considerable expense, and then had to be flown by a test pilot. No remotely controlled flight this. The attendant risk to pilot and plane made excellent movie material. It also made progress a slow and costly process indeed, to say nothing of the shortage of test pilots it incurred.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DRAWING of X-1, high-speed research ship, shows installations

In the tunnel, planes initially unstable in flight are often modified right there, and made flight-worthy at practically no cost—and no danger. A complete flight analysis report with flight films is compiled and made available to the builder.

Spins are a constant source of worry to the aviator. To combat this problem the NACA lab at Langley field keeps its "spin" tunnel busy most of the time. This tunnel is a unique 20-foot vertical affair, with the air inlet at the bottom and the outlet at the top. It looks something like a silo. Small-scale dynamic models of plane types, with the weight distribution identical to the parent design, are tossed into this tunnel with controls locked in spin condition and allowed to wind up.

After the plane has settled down to a steady spin, a magnetic field is set up within the tunnel which trips a solenoid attached to the plane's controls. This solenoid, in turn, snaps the controls into a neutral condition or one opposing the spin. In this manner, the spinning plane's ability to recover is studied. By varying the control forces used, it can be determined just what is required to make a particular plane recover from any spin.

One model may recover with controls neutralized, another with full opposite rudder, still another with opposite rudder and opposite ailerons. In numerous instances, the spin-tunnel results have influenced the final design of an airplane yet to be built. Based on the information obtained during these tests, it has been possible to establish tail-design requirements which indicate the minimum conditions for satisfactory spin recovery.

If you like your whiskey clear, perhaps you enjoy the exhilerating workout which can be had by flying into the middle of a nice nasty thunderhead. It is one way of finding out how ironclad a stomach can get, and it does an excellent job of proving whether or not the wings of an airplane are permanent installations. These loads put on an aircraft, and a stomach, in a thunderstorm, are caused by vertical air currents. They are known as "gust" loads.

Down at Langley, rather than tear aircraft apart in thunderstorms, gust loads are simulated in another special wind tunnel. In this "gust' tunnel models of approximately six-foot span are catapulted to speeds up to 100 mph. then released and allowed to fly over a controlled vertical gust. This enables NACA to conduct a number of investigations on the reactions of airplanes to gusts having known characteristics.

For example, the NACA recently tested a canard-type—controls surfaces forward—airplane in this tunnel and found that gust load increments were greater on this design than on conventional types. As a result of information gained in the gust tunnel, a gust-alleviation flap has been devised and at present it is undergoing test. It appears to offer promising possibilities. It may mean that nauseating bumps will be removed entirely from future air travel.

In the high-speed wind tunnels a large number of supersonic airfoil sections have been tested. The lift, drag and pitching moment can be calculated up to mach 8.0 —6,000 mph at sea level.

A large slice of the work going on at the Cleveland laboratory, where the majority of the investigations concern powerplants, is devoted to making the jet engine more efficient. Recently concluded was an investigation of "blow-out" on turbo-jet engines.

Tests proved that "blow-out" was due to air inlet combustor conditions and could occur at altitudes from 14,000 feet up. Blow-out is due, primarily, to a reduction in compressor rpm to the point where inlet pressure, inlet temperature and inlet velocity of the air to the combustor sets up an undesirable condition. As altitude is gained in a turbojet-powered plane, more and more rpm is required to give efficient operation until the critical operating altitude is reached.

In the giant Icing Research wind tunnel at Cleveland, problems of the weather

(Continued on page 54)

Navy's Pirate

(Continued from page 49)

ments, Nissen and Greenwood have been extending the present *Pirate* design to high-performance levels. Add to the Chance Vought staffs those of the Westinghouse and Solar development groups, and tracing development credit on a new plane suddenly becomes an impossibility. Each little part of aircraft design seems to be due to a great network of rivers all pouring into a main channel.

One of the contributory streams that makes for the small-size, light-weight, uncomplicated design and sleek finish of the *Pirate* is the use of Metalite, developed by Chance Vought engineers. Formed by the bonding of two thin sheets of high-strength aluminum alloy to a balsa wood core, Metalite possesses great inherent rigidity, and thus not only requires fewer internal reinforcing members when used for the external aircraft structure, but large sections can be molded as single units, reducing the number of joints and wind-drag protuberances. Not the least of the plus factors is the addition of a high-quality surface finish, which on the first experimental *Pirate* has been in service for two years without showing any need of refurbishing. The wings, fuselage and fixed stabilizers are all constructed largely with Metalite and the mirror-like finish of the surfaces is considered a new peak in aircraft-production technique.

The *Pirate* is also unique in that it has exactly one external panel fastener on its entire structure and that is a push-button type for opening the ammunition door in the outside of the cockpit wall. Just inside the ammo door, a handle operates the cable-controlled latches that open the fibreglass-stainless steel gun bay, equipped for 20-mm. cannon. The engine panels are opened by remote cable control in a wheel well.

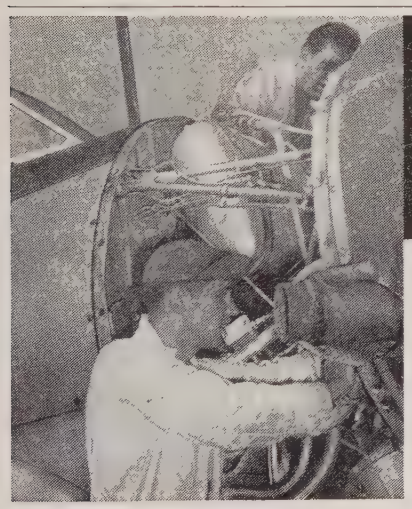
The molded plastic bubble canopy is manually controlled and hydraulically operated on the production *Pirate*, which mainly utilizes engine-driven hydraulic power with electric pumps for supplemental operation. The cockpit installations of controls and instruments follow the Navy's psychologically-proven design, standard for all new Navy aircraft, and includes a 40G pilot-ejection seat. Because of the side-to-side slimness of the fuselage there is less room in the *Pirate* than in the *Corsair*.

As far as accessory systems are concerned, the 20-mm. gun packages are set in two pairs, one on each side of the lower nose, with room in the top section for any radio or radar installations necessary. The wheels and gears are conventional, utilizing Goodyear brakes, while a fuselage step to the cockpit forward of the wing retracts as the gear is raised on take-off. The radio mast shown in the prototype photos is strictly temporary, with the production model utilizing a concealed antenna as on other jets. The obsolete status of the conventional mast is pointed up by the fact that on one of the test planes it was bent completely back during a high-speed dive.

Although production has begun on the Chance Vought *Pirate* at Stratford on a Navy contract for a first order of 30 planes future *Pirates* will be built at a Government-owned plant, leased by Chance Vought from the Navy, near Dallas, Texas. While full-scale production will continue at Stratford until the end of this year, preliminary steps already have been taken for one of the largest and most distant transfers of manufacturing operations in the history of American industry, with the entire change-over scheduled to take from a year to 18 months. The Dallas plant, war-built for North American Aviation, doubles the available floor space for Chance Vought and represents the second move in the company's 31-year continuous history of building aircraft.

The Dallas plant will undoubtedly be the production scene for newer, more powerful versions of the *Pirate* and other, still secret Chance Vought jet aircraft developments.

Just as the first *Corsair*, the O2U-1, in a distinguished line bridged the move from the original plant in Long Island City, N. Y., after 13 years, to Stratford, Conn., the first *Pirate*, in what may be a long sequence, bridges a move to Dallas after 18 years. Better watch for a long and continually improved line of *Pirates* by Chance Vought.



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Racing Pilot

(Continued from page 33)

to break into this air-race business. The little planes are popular and they put on a good show for the crowd, almost in their laps, where they can see the whole race. The course for these midgets measures two miles to the lap and in the two races that have been run to date, the pylons have been spaced in a rectangle. A more spectacular race, I believe, could be presented if only three pylons were used and the midget planes raced through 120° turns.

The best feature of these new midgets is that almost anyone can enter. We have deliberately written the rules so that the "back-yard mechanic" with a go-fast idea and not too much money, can compete. Our engines, for instance, are stock models that do not exceed 190 cubic inches, propellers are fixed-pitch, and retractable landing gears are not permitted.

It isn't the high speed, but the spirit of close competition that makes box office receipts at any race. Horse races, motorcycles and midget race cars aren't really fast, but they draw big crowds because of the close, evenly matched competition. It's the same thing with these little racing planes. We can give the customers a real run for their money without ever reaching 200 mph, and it is all wide-open competition. Anyone who can throw a plane together and fly it with reasonable accuracy can enter. The high cost of prewar racers like my "Goon" that cost $12,500, not counting my labor, kept most pilots out of airplane racing. The "Goon" nearly paid for itself, however, by winning the Greve Trophy race in 1939 with $12,000 for first place.

This whole midget-plane business was thought up during the 1939 prewar Cleveland Air Races, but it didn't get beyond the idea stage until after the war. At the request of the Air Race management, I acted as referee for the first postwar races in 1946. When the paying customers started walking out before the end of the featured races in heavy, surplus aircraft, the promoters asked some of us old-time pilots to do something to make the races more interesting. After all, who could blame the customers for walking out when all they saw of the races was as the planes roared past the stands 10 times. The rest of the 30-mile course was out of sight of the stands and the average "Sunday driver" was seeing more of the event than the cash customer.

From a promoter's standpoint, then, the midgets were a logical answer. Pylons of the two-mile course can easily be placed within the actual boundaries of the airport and, with most of the competition taking place at an altitude of less than 50 feet, spectators don't see much without a ticket of admission.

One of the prime headaches in staging an airplane race has always been the lack of entries. In the past year, the Continental engine company has received over 300 inquiries for midget-plane engines, so there should be more than enough planes for any future competition. This midget class, incidentally, was actually set-up as 190 cubic-inch before the war when three engine companies were building motors of this size. The other two companies are now building large engines but Continental has been most cooperative by supplying their stock engines at a manufacturer's discount to all our members for use in these midgets.

These planes are cheap enough to build so that anyone with the yen to compete in closed-course racing can try his hand in this exciting new sport. Even at today's prices, $2,000 will cover the cost of all materials: engine, wheels, propeller, metal, wood and fabric. Design and construction time, of course, is another matter. That can run sky-high, but it is still in the hobby classification.

Speeds are slow enough to be comparatively safe, yet the action takes place so close to the spectators that it looks much faster than it actually is. By limiting these planes to stock engines, fixed-pitch props and standard landing gears with 500x5 tires, there are only a few design refinements that will make one plane faster than another. That makes for close, crowd-pleasing competition, and still keeps costs down. That fixed-pitch prop, for instance, costs about $50 against $350 or more for a controllable propeller.

Midget-plane racing is one of the few sports where a good little man is better than a good big man. It's all merely a question of weight. Our minimum specifications call for all midget racers to weigh at least 500 pounds empty; that's to discourage flimzy designs that might get someone hurt. I weigh 170 pounds, and it gives me a great handicap against Steve Whittman's 20-year-old jockey-pilot Bill Brennand who weighs 105. Mike Argander who will fly my second plane in the Goodyear race this year, weighs only 125 after he eats. That's one of the reasons he is flying for me. You see, that lack of weight makes for faster acceleration and gives the little man behind the controls a chance to get into the first turn first. That's where many of these midget races are won.

The pilot in the lead at the end of the first turn has all the breaks. First, he is flying in undisturbed air and there is no turbulent slipstream to worry about. Secondly, he can take the pylons as he chooses and the planes behind him must govern themselves accordingly. The rules of these midget races are such that you can't cut in on a plane after passing him until you are at least 150 feet ahead of him, and there are few of these midgets that will pick up 150 feet in the less-than-¾-mile straightaway. That means that the pilot who is doing the passing must swing wide on his turns or pull up over the slower planes. That's why the race-horse starts see the mechanics give these little planes as much of a push as they can when the red and white starting flags are dropped. Every little bit helps in getting into the first turn first.

There are plenty of tricks in this game of closed-course racing and any beginning pilot shouldn't expect to win his

(Continued on page 55)

Barnyard Barnstormer

(Continued from page 29)

tooled leather belt, young Doc Mohr has become an expert in setting down any of his three planes in all shapes and sizes of cow pastures and hay meadows.

In addition to his L-5, Doc owns part interest in a BT-13 and a PT-19. The original cost of the planes in normal times might be a deterring factor for veterinarians wishing to take up flying, but Doc bought his Army surplus planes at amazing savings. His L-5, for which he paid $1,600, was worth $8,000 to the Government when new; the PT-19 cost only $1,275, but cost the Government around $10,000; the BT-13, a $37,500 plane, cost $975 as Army surplus.

In his "wingless" days, Dr. Mohr drove 60,000 miles a year, and the wide level hay meadows he passed on his hot dusty trips to the Oklahoma pan-handle looked more and more like landing fields as his interest in flying increased.

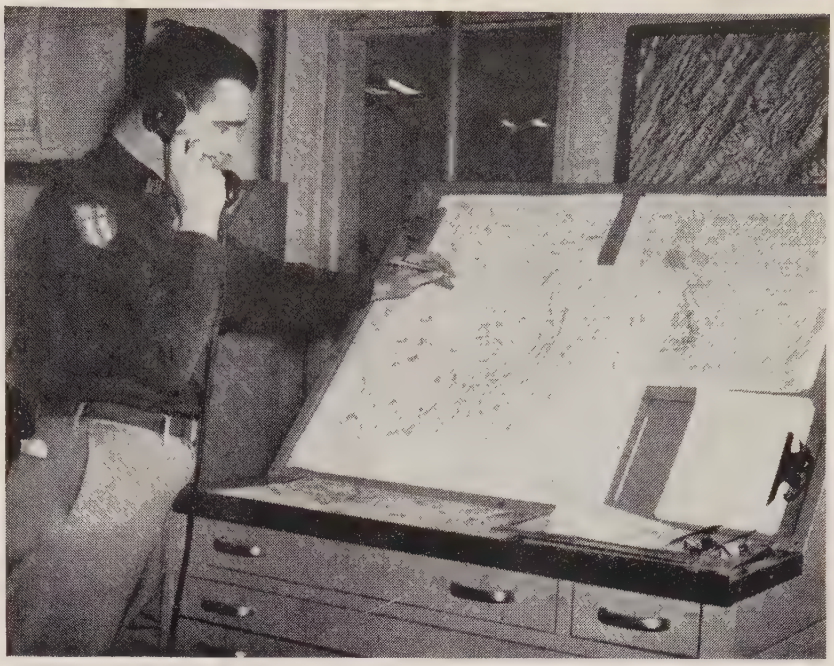
Today, with his shingle on wings, the barnyard barnstormer makes routine trips to ranches all over the thousands of miles of rolling southwest cattle country. He makes emergency calls to ranches and farms in Missouri, western Oklahoma, Texas, Kansas, and Arkansas.

Such an extensive field of practice keeps Mohr pretty busy, but he takes time out now and then for the National Flying Farmers conventions held in Stillwater, Oklahoma. These air-minded agriculturists use small private planes for such time-taking ranch routine as checking fences and riding herd on far-grazing cattle. "And it's just good horse sense to keep up with your clients," opines young Doc.

Mohr finds most of his clients, whether they're personally interested in flying or not, as enthusiastic about his planes as they are about his skilled surgery. A few weeks ago young Doc flew his BT-13 to a small country rodeo a few miles west of Tulsa. Bull-dogging and calf-roping took a dusty back seat as the broad-shouldered veterinarian with the fancy cowboy boots lured the farmers off the fence rails to give them their first airplane ride. One of the passengers carefully removed his quid as a last-minute precaution, but otherwise the farmers agreed they felt as safe flying with Doc as ploughing up the north 40 on their own tractors.

Thirty-four-year-old Dr. Mohr, Jr., is "young Doc" because "old Doc" is the senior Doctor Mohr, a pioneer Oklahoma veterinarian who used to make his calls around the Sapulpa oil fields in a two-horse-power buckboard instead of a 400-hp plane. And old Doc, today in partnership with his talented son, still sticks to the more conservative automobile.

But young Doc is determined that flying is only the beginning for him and other veterinarians like him. Just as his colorful father pioneered in the days when veterinary medicine was emerging as a real science requiring skilled, well-trained doctors, so young Doc is pioneering today to bring greater advancements to the profession.

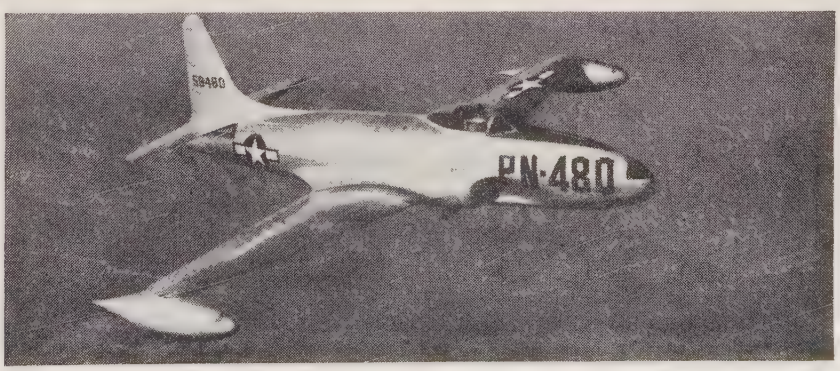


CAPT. R. L. TATUM, of Langley AF Base weather office, broadcasts latest weather information directly to pilot of approaching F-80

Weather Info To Jets

THE Air Force has developed a new system of radio-telephone weather forecaster and the pilot of high-speed jet aircraft, thus eliminating problems created by high fuel consumption and high speed of jet planes with the old time-consuming "stand-by" radio contact system. Under the new system the conversation is comparable to a telephone conversation, going from pilot's transmitter to airways receiver, over wires to weather station; then from weather phone over wires to airways transmitter and through the air back to the jet plane's receiver. For example, a pilot of a jet plane, when in vicinity of one of three bases where this new system is being service tested, calls that base's airways station on his VHF radio, requesting weather forecast for remaining part of his flight. The airways operator presses a button and throws toggle switch . . . the button rings a bell in weather station to alert the forecaster, and the switch places a French-type phone into the receiver and transmitter circuits of the airways VHF channel. The installation contains remote control units which match phone to microphone and speaker in the airways station. Tests so far indicate this new system is very successful and undoubtedly will be utilized by all types of aircraft, commercial and military, in the future.

HIGH SPEED and fuel consumption of AF's jet aircraft make use of old "stand-by" method of radio contacting inefficient, impractical



Aviation's Whip

(Continued from page 50)

are solved. Capable of reproducing practically any weather condition desired, the icing tunnel can provide winds up to 430 mph in temperatures ranging as low as 40° below zero, while producing rain at rate of 1,500 tons of water every 24 hours.

But no matter how ingenious wind tunnels become, they cannot simulate accurately every flight condition. To fill in the information not obtainable in wind tunnels, the NACA uses a variety of other aviation research techniques.

There is the "free-falling" technique, used for gaining transonic and supersonic information. It consists of taking a research vehicle up to maximum altitude that can be attained by the carrying plane and dropping it. The free-falling body is usually a needle-nosed, ear-perfect aerodynamic design, and has high-speed low-drag wing, elevators and rudder.

Each of these components is completely instrumented. Pressure orifices are installed to measure the air pressures; strain, flutter and vibration gauges record those data. The body is filled with recording and telemetering equipment. On the way down, while the body is accelerating to and beyond the speed of sound, continuous readings are telemetered to the ground and the flight path is tracked by radar.

Another research system first perfected by the NACA is the "wingflow" method. Used in both wind tunnels and in free flight, the system, as the name implies, takes advantage of the air flow over a wing to gain certain data. A small-scale section of the unit being tested, i.e. wing, rudder, or in some cases a half fuselage with one wing and elevator attached, is mounted on top of a conventional airplane wing and completely instrumented. Forces can then be measured from subsonic speeds through the air at a speed of mach .75—570 mph—may have an airflow over the wing of up to mach 1.3—990 mph. Flutter, drag and vibration are measured in this manner.

Rockets are being used extensively for research in the high-speed regions. Fully instrumented, high-speed components are built into the rocket, and during flight, information is telemetered to the ground.

Though the NACA facilities are usually considered to be laboratories, and they have reduced aeronautical investigation to an exact science, don't get the mistaken idea that they are composed of a group of long-hair characters dabbling around in musty cellars amid rows of shiny calculating machines. It isn't all push-button and drawing-board research. They fly too.

Today, a couple of pilots on the west coast are flying the X-1 at speeds faster than sound, under NACA auspices. At Langley field, Mel Gough and his boys are busy flying the Air Forces and Navy's hottest planes, among them the first swept-back high-speed wing model, the Bell L-39. The L-39 is a converted Bell *Kingcobra* equipped with a 35° sweptback wing.

Definitely, for the latest in aviation, look to the NACA.

Know a Good Lawyer

(Continued from page 31)

and only then, will the strong need for a lawyer and the subsequent additional expense that is heaped on the already heavy burden of flying—be unnecessary.

For the speed-happy highway cruiser, a violation of speed regulations will cost him a nominal sum, generally, one dollar per mile for each unit above the speed limit, plus costs, two or three dollars. But try flying below prescribed altitudes and see if you can get off by paying a buck for each 100 feet below the minimum!

Where is the difference for courts to discipline the private pilot with unparallel hardships?

We don't want to give the idea that we're trying to make it any easier for a willful violator of flight safety rule. We just want to have flying put on a level comparable to ground activities. It seems necessary now, however, that to do this,

we must have a law enforcement educated in the complexities of flying.

To the end that existing descrepancies in court and police attitude may be dissolved, you should know what is wrong. Specifically, the following faults can be pointed out:

1. Many courts, geared to the highway level of thinking, fail to consider the extenuating circumstances that are involved in flying. As a result, the courts hand down decisions based on colored facts.

What does this mean? Well, let's take a case from the midwest for example. Last summer, Mr. Ernest J. Straub, a Kansas City construction engineer, was arraigned before a city court and found guilty of low, dangerous flying over a populated area.

As Mr. Straub reports the case, he was flying at 1,300 feet at the time. The KC city aviation director who was in the neighborhood said that Mr. Straub was closer to 500 feet than he was to 1,000 feet. To check the altitude, the aviation director sent a plane aloft on the following day to see if the numbers on the plane could be identified at the altitude Mr. Straub said he was flying. The numbers were indistinguishable. The prosecution, as a result, assumed that Mr. Straub was lying. When the city's aviation director has this evidence submitted at Straub's hearing, the judge wisely disregarded it, because, in attempting to convict the flyer, a *smaller plane with smaller numerals* had been used!

But the court did convict Straub! Why? Because he was below *arbitrarily* prescribed limits. Though above 1,000 feet, Straub was, supposedly, below an altitude that would have permitted him to execute a safe landing in an emergency. The minimum altitude—2,000 feet—was established at the hearings upon the testimony of the aviation director and his associates.

Straub's argument that he was flying over a sparsely populated area where golf courses and parks afforded many landing spots was ignored, and so was his contention that the negligible wind afforded an 8/1 to 10/1 gliding range.

In a much more celebrated case than that which Mr. Straub was involved in, five Navy pilots were acquitted of the same charge because the court, all members of which were familiar with aviation and flying problems, *did* accept glide figures of the same sort.

2. Indiscriminate arrests and convictions are prevalent in lower state courts. Instead of "first come, first served" as law should be, this is a situation, too often repeated, of "first caught, first stuck". Flyers, trying to dodge the costs of a regular trial, get stuck for exhorbitant fines by law enforcement bodies which exist from the take from hapless defendants.

A good example of this can be found in a report turned in not so long ago. William Novick, a practicing California physician, was flying from Newport to Santa Monica along the Pacific Coast, a distance of about 40 miles. It was a weekday morning and the coast was clear of aircraft, so Dr. Novick, in his own words, went down to an altitude of about 150 to 200 feet, staying better than 300 feet off shore.

Suddenly, a plane with a label "SHERIFF" flew alongside and the pilot motioned to Dr. Novick to follow him. Thinking something was wrong with his own plane, the doctor did so. On landing at Clover Field, however, the physician was informed that he was under arrest.

Dr. Novick explained that his action had been made in all innocence of any violation. Nevertheless, he was summoned to appear before Justice of the Peace Frank R. Carroll of Grandena, Calif., and was subsequently fined $500.

"I asked Justice Carroll why the fine was so heavy", Dr. Novick reported. "In comparison to my automobile, I would not have been fined a similar amount for anything short of multiple manslaughter. His reply, and these are his exact words, 'If you can afford to fly you can afford to pay'."

Dr. Novick's afterthought: "My advice to anyone else who might have to appear in court on any charge in relation to flying, no matter how minor it may appear, is *demand a regular trial.*"

3. The jealousy existing between municipal, state and federal jurisdictions has become a vicious clipping tool that finds the private flyer caught between the pincers. Sometimes, the municipal and state courts demand a right to reap the harvest from the "culprit;" other times, rather than face a reversal of decision in a higher court and a resulting black mark on their record, lower courts pass along the buck.

In New York City recently a fight was waging over who would assume the responsibility for flight safety regulations violations. New York wanted to lift the responsibility from its shoulders. So when John M. Jewett, Jr., was arraigned in a City of New York court for supposed violations of CAA and local flight rules, the judge discharged the defendant and passed the case along for federal inquiry.

One Sunday afternoon, ex-AAF fighter-pilot Jewett had taken a girl friend for a hop over the city. Flying about 5,000 feet, the plane's engine quit.

Following approved AAF procedure, Jewett dove his lightplane a number of times attempting to windmill the prop and start his engine. When the engine failed to catch, Jewett looked for a spot to land. The Hudson river gleamed beneath him. So did a 400-foot break in northbound traffic on the Henry Hudson Parkway. Jewett, fearing his girl friend would prove too much a novice for a water landing, chose to land in the break in traffic.

Jewett barely had time to pat himself on the back for his fine airmanship when city police arrived and charged him with low-altitude maneuvers over the city without a parachute and voluntary landing on a restricted parkway.

One of the officers felt the plane's engine an hour and 50 minutes after landing, found it to be still warm and thereby concluded that the maneuvers and landing had been of the pilot's volition—*not* a result of engine failure. Fortunately, or unfortunately, as the case turned out, the municipal magistrate did not agree. So, he suggested that CAB investigate the element of the case.

CAB did just that, ultimately demanding under CAR part 651.21 (Violations of Titles V and VI of the Civil Aeronautics Act of 1938) a compromise settlement of $250 from Jewett. Acquitted by a civil court, the ex-AAF pilot was now forced to pay heavily for the choice of protecting his passenger. Jewett eventually got out on an appeal, for *only* $150.

This compromise act was originally planned to protect the private flyer. Should a pilot be fined the maximum amount of $1,000 by a local or state court for violation of CAR, he could get a compromise settlement through the CAB. All of which is very fine. But in this case, as in many others, the CAB had wangled money from a pilot through an unnecessary compromise. You understand, of course, that if you *don't* accept the compromise, your only out is to stand trial in a federal court—a process which will inevitably cost more than the compromise.

What should be the first remedial step?

(Continued on page 58)

Racing Pilot

(Continued from page 52)

first few races. As in any other sport, the beginner should be conservative and learn the short-cuts of the game, and only then go out after the top prize money. Aside from a quick start, most races are won in the turns. It is surprising how many pilots, good ones too, don't know how to make a fast turn around a pylon. The secret of the thing is in holding your altitude; not sliding up in your turns and diving the straightaways. Then you always must anticipate where you'll find prop-wash and stay away from it. That's the main reason that I design my racers to be very "touchy" on the controls. I've encountered prop-wash at 50-feet above the ground that would have rolled a sluggish airplane right over on its back.

Actually, I get as much or more enjoyment in designing, building and testing my planes as I do in flying them in races. Take the original V-tail on the "Sweet Pea." It didn't handle too well on the ground; there wasn't enough rudder control before take-off and during the landing roll, so I changed over to a conventional tail group—and lost 8 mph. Naturally, I replaced the V tail and checked farther into the problem. I found that there was too much weight on the tail skid so I moved the landing gear back 5½ inches and now the plane handles fine on the ground.

Here's another way that I'm refining the design of the "Sweet Pea." I painted "Wimpy," that's my number 2 airplane, with whitewash and flew it through a small rain cloud. The eddies of air passing over the wings and around the fuselage showed in the whitewash where more streamlining was needed. I copied this stunt from John Livingston, from the old days of racing commercial planes when we first started to use the skies as a wind tunnel and glued yarn on the wings to test air flow. For pilots like myself who build airplanes on a shoestring, this has proved an inexpensive way of getting wind-tunnel data.

Last year my "Sweet Pea" turned as high as 200 mph on the straightaway with 3,300 rpm. Normal turns pull about 4 G's, but I've registered 10½ G's during demonstration pull-outs, and those thin cantilever wings are still on the airplane. This year, "Wimpy" and "Sweet Pea II" should be even faster since they're both lighter than the original plane.

All in all, this midget racing is a lot of fun. Nowhere I know of is the competition keener between designer, builder and pilot than in these pint-sized puddle-jumpers. While it is essentially a young man's game, I'm 48 and I'm still racing after 20 years of slicing pylons. The 132 members of the Professional Race Pilot's Association, range from 20-year-old Bill Brennand to, you guessed it . . . I'm the grandpappy of the outfit.

Maybe I'm still racing because I have no patience with a slow airplane. The chief virtue of any aircraft is its speed, and if it isn't fast, then why fly?

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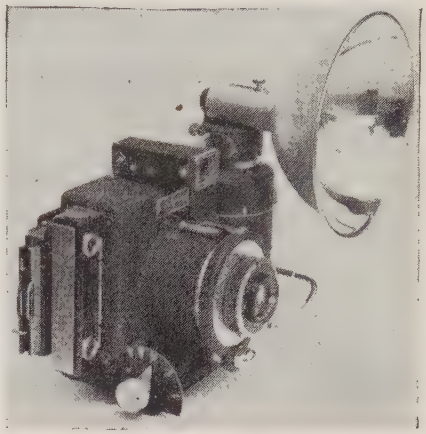

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Know a Good Lawyer?

(continued from page 55)

Just this—jurisdiction over violations of CAR *must be* placed in the hands of the federal or the state governments—*not both.* If it's the federal government, a procedure which skirts the expense of criminal prosecution and obliviates the coercive compromise must be worked out.

If it's the state, then a police force, educated to the responsibility which it holds and the variance of the activity with which it deals, must be developed. This can be done. It has been done—in Pennsylvania. There a staff of thoroughly trained state policemen are responsible for aeronautical enforcement.

The Pennsylvania Aeronautical Commission brags, and justly so, that a case is not prosecuted against a pilot in the state unless there is sufficient valid evidence to convict the defendant.

If the violator chooses to plead his case in court, the investigator pushes the prosecution with the preponderence of evidence alone. He does not prosecute according to his personal feelings.

Four aeronautically adapted investigators work in each of four districts of the state. One investigator remains at the Commission's headquarters in Harrisburg. These men, aside from their investigations, work on a public relations program. This includes attending aviation group meetings—often speaking to them. Thus, they are able to delete many possible violators before the acts are committed.

Pennsylvania has experienced a slash of 50 per cent in violations reported.

Pennsylvania's laws vary only slightly from those of the federal government and slowly they are coming to the vantage point of restricting a pilot no more, financially, then a motorist.

It is time we reached a standard that is a standard the country over. You as an individual pilot are handicapped. Only through the aid of other pilots, working on the non-flying majority of the American people, can we come to have justice for flyers.

For you, this is a vital interest. To protect it, here are a few steps:

1. Get strength through pilot unity.
2. Publicize flying as an entity separate from other modes of public conveyance.
3. Discuss the situation with the proper local and state authorities.
4. Push for fewer, more concise local and state regulations, making sure that these do not merely reiterate or, worse, restrict flying more than do federal laws.
5. Help your state officials to maintain an aviation commission that is helpful and not restrictive on pilots.
6. When arraigned before a civil authority for an alleged violation and in doubt about your guilt, *demand a trial.*
7. Know the rules and abide by them. If you don't like the rules, fight to get them changed, but don't violate them.

Lots of flyers can afford flying and lawyers, both. But the majority can't. What are you going to do about it—now? Now, before you get rooked?

Dilbert

(continued from page 37)

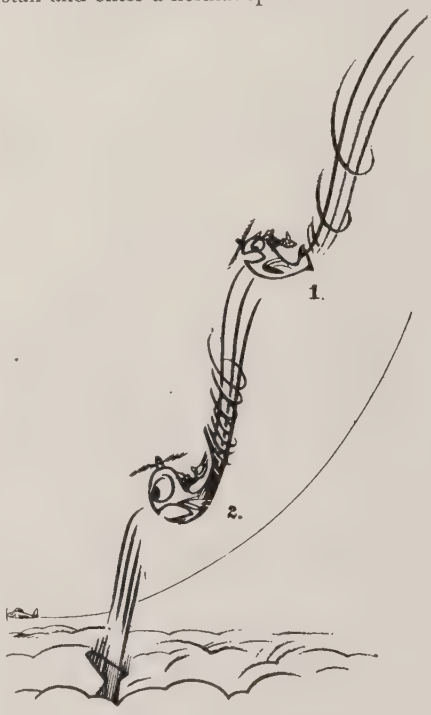
sumption while en route.

d. Plan ample refueling points.

e. Watch for unexpected headwinds.

Get Fuel Conscious—They Won't Fly Without Gas!

PROGRESSIVE STALLS AND SPINS—While executing an Immelman, the pilot allowed his surplus-property fighter to stall and enter a normal spin. Rotation was



stopped by the proper technique, but the pilot evidently tried to pull out too rapidly, for the plane immediately stalled and whipped into a violent spin in the opposite direction. Shortly after this, the pilot bailed out. He later stated that the second spin was abnormal in that it was so much faster than the first.

This pilot had 850 hours flight time, but his reaction in this emergency brands him as a rank amateur. Evidently he had never heard of the progressive stall characteristics possessed by all aircraft. This is the tendency of any plane to stall at increasingly higher airspeeds as higher acceleration ("g") is attained.

All conventional airplanes are designed to stall at a certain airspeed under certain flight conditions; namely, for a specified gross weight, at sea level, and at a temperature of 150° C. Stalling speeds listed in performance charts are figured on this basis. Any change in these conditions will change the stalling speed. Naturally, if you carry less weight, you can fly at a slower speed without stalling. But don't forget, if you overload an airplane, it will stall at a higher speed.

The stalling speed of an airplane is mainly dependent on wing loading. The higher the wing loading, the higher the stalling speed; the formula being that the stalling speed of any particular plane varies as the square root of the wing loading. Also, the wing loading of any airplane increases in direct proportion to any increase in acceleration ("g"); thereby giving us the simple formula that stalling speed increases as the square root of "g".

Thus we find that during recovery from a dive or spin, if we use a 4 "g" pull-out, our stalling speed will go up during this period as the square root of 4, or twice the normal stalling speed. And a 9 "g" pull-out will give us three times normal stalling speed. In other words, an airplane with a normal stalling speed of 70 mph will stall at 140 mph during a 4 "g" pull-out and at 210 mph if 9 "g" is reached. Do you begin to see why it is so easy to go from one spin into another at progressively higher stalling speeds?

Recovery technique for a spin entered from a progressive, or high-speed stall, is the same as for a normal spin, except that, due to the faster spin, it will usually be necessary to apply corrective controls for a longer time to get the desired results. Also, because of the higher speed, the pull-out must be less abrupt; sharp pull-outs increase the "g's" and, therefore, the stalling speed. Failure to allow for this is the major cause of progressive stalls.

Don't forget one other important factor which affects stalling speed; that is angle of bank. Wings have less lift in this position, thus causing airplanes to stall and spin at higher speeds when banked than in level flight. This is equally true during the recovery from spins or dives and for this reason, it is important that wings be level during such recoveries.

There is no way of beating these basic flight laws. It behooves you to recognize them and fly accordingly.

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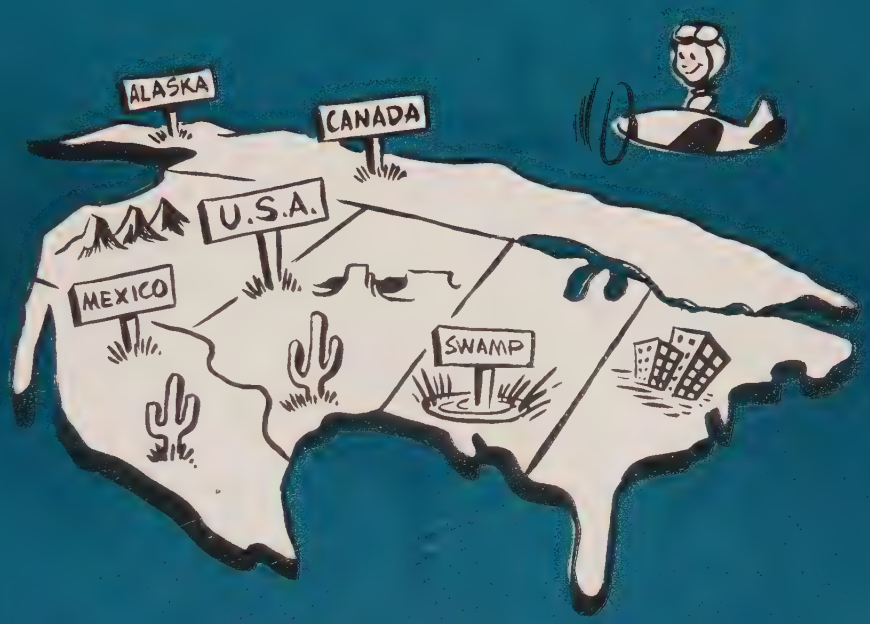
TERRAIN *Flying*



THE CAA, in cooperation with its regional offices and agents, has prepared this flying "tool" for the private flyer. Contained herein is the advice distilled from many long hours in flight by veteran pilots. The CAA has given SKYWAYS permission to reprint this advice. Part I contains information for safe mountain flying.

TERRAIN FLYING

IS THAT phrase, "terrain flying," familiar to you?

The Civil Aeronautics Administration hopes it will be because it is important to you as a private flyer.

The dictionary says of "terrain":

"... a tract or region of ground immediately under observation"—so terrain flying refers to the problems of flying over various kinds of landscape.

We have gathered here some thoughts, advice, warnings, and "hangar flying" which we think you ought to read and study.

There was a time—and not so long ago—when all pilots talked "terrain" before every flight over a new route. That's still a good idea. But with the advent of more and better instruments, a few more air markers, better maps, more dependable engines, and planes with longer range, the practice is less prevalent.

The idea still is so good, however, that we've done a lot of terrain talking for you, and have written down the best thoughts of those who have "been there" before you.

These airmen have learned what they know in two ways: By personal and often rugged experience, and by talking to a character known as the "Senior Local Pilot" before starting off over a terrain new to them.

He's still around, this SLP—still flying and adding up the hours because he's cautious, careful, and obeys the regulations. If you just listen casually at the average airport, or listen with great concentration and intentness at a Quiet Birdmen's meeting, you'll probably hear him sounding off. You can learn a lot from an SLP. Like all private flyers, he's a swell guy and eager and happy to share his flying knowledge with you.

But the SLP is not always available. You can't depend on his being at the airport before you take off on a new flight. So here are his ideas, his warnings, do's and don'ts for safe flight.

Note well that there is no advice offered *against* flying any particular section of the United States. If you can fly, you can go almost anywhere. It's wonderful, to be able to fly over mountains, swamps, deserts, etc. weather, unless it is necessary.

Moreover, it is safe, if you do it right. What this section wants to say is that you are welcome anywhere in your airplane; and you are safe, *if* you take the good advice of those who have flown before where you are flying now.

Forewarned of special conditions, you can adapt your flying, you can use the advice and heed the warnings of the SLP. The CAA urges you to read this before you take off into strange country. For your convenience, it is divided according to the seven classes of terrain; and while there may be repetition in some of the advice given, read it, remember it, and live to fly.

The Alleghenies

"Graveyards of pilots" they used to call the Alleghenies. For our purposes we consider the whole Appalachian chain, from the Smokies down south to the White Mountains in Maine, including the Catskills in New York. These are mountains of a general similarity, different from the Rockies; and oh, how different from the flat lands in Indiana. Naturally, there are fewer airports. Also, it is much easier to become lost over mountainous terrain. Listen to an SLP on the subject of the Alleghenies.

Roland Rohlfs, Assistant to the Administrator of the First Region for Personal Flying Development, says:

"Avoid crossing these mountains in single-engined craft, especially in bad weather, unless it is necessary.

"It is best to follow the path of valleys, main highways, or railroads crossing a range, rather than to fly 'airline' regardless of the terrain under your wing. Airports and usable fields are more prevalent along such routes. Establishd airways are generally better to follow than not, but caution should be exercised in checking your range of action, especially if head winds are contemplated. No extended flight over mountainous terrain is advised if weather is questionable.

"It is a wise practice to seek advice from local operators before taking off on a mountainous cross-country flight, and it is further advisable to file a flight plan. Another point to bear in mind is the rapidity with which dusk closes in at the end of day in the mountains. Allow yourself an extra half hour if your destination is in mountainous territory.

"Do not fly below 1,000 feet, and be sure to fly higher if a strong wind is blowing. Turbulence, with severe rising and falling currents, may be present. Allow yourself ample air speed for combating these conditions, especially when landing at elevated places.

"In winter, sudden local storms which are not reportable can appear from nowhere in the mountains. They bring high winds, snow, and, worst of all, sleet.

"When in doubt, go the long way round, but watch your gas."

Tom H. Davis, an SLP of Winston-Salem, N. C., says pilots should insist on visibility even more than ceiling when flying in mountain terrain. Rainfall, he says, can reduce forward visibility to zero within a very short period of time.

"The natural darkness, accompanied by summer thunderstorms, blends in perfectly with the color of mountains; and it is difficult under such conditions to determine any horizon. It is very easy to fly into the side of a hill when it appears to be only another dark spot."

John W. Terrell, an SLP of Hickory, N. C., who has been flying Allegheny terrain for 16 years, believes the most important thing for any pilot flying over the mountains is to file a flight plane, even in good weather.

"We have had one pilot crack up on the side of Grandfather Mountain, and he died of exposure and not of injuries. He had been out five days before anybody thought of looking for him."

Carl W. Clifford, CAA official, formerly in charge of personal flying in the Second Region, consisting of the southeastern States, has this to say about the southern portion of the chain:

"In the Smoky Mountains cloud formations are encountered when the skies are clear a short distance from the mountains. At the edge of the mountains the clouds are small and scattered cumulus, and they increase in size and height as one gets farther into the mountain area. Therefore, although the weather is perfect on each side of the mountains, bad visibility can and often does prevail over them.

"The safest plan for the novice, or the pilot inexperienced in mountain flying, is to land at an airport near the Smokies and get some advice from the natives. Mountain wind conditions sometimes are peculiar. At Morristown, Tenn., just north of the Great Smoky Range, prevailing winds are northwest to southwest 60 per cent of the time. Just south of the range, some 60 airline miles away, the winds at Asheville, N. C., blow north to northwest 26.4 per cent of the time and are calm 44.8 per cent of the time. This variation in wind behavior suggests special caution in Appalachian mountain flying.

"The most hazardous portion of this mountain system is the area known as the

Great Smoky Mountains National Park and extends for several miles up and down the range from that section. Actually, there are reported to be many planes in that section which have been lost and never found. Experienced pilots usually elect to go around rather than cross over this area, unless they are perfectly equipped. There is a pass running from Asheville, N. C., northwestward up the French Broad River toward Newport, Tenn., where the crossing can be made at 2,500 to 3,000 feet if the visibility is good."

Listing the best routes throughout his region for the novice pilot, Clifford advises: "First off, a good general suggestion is to pick from the sectional chart a main highway or railroad that runs along the desired course, even though it meanders somewhat, and stay with it. This is particularly advisable when flying over swamp areas."

You can consider that as sound advice for every kind of terrain. As to swamps, Clifford has many in his region, and there will be more details about that kind of flying later.

You will usually enter the Second Region, says Clifford, from New Orleans, or Jackson, Miss.; Memphis, Nashville, or "Tri - Cities," Tenn.; Greensboro, or Raleigh, N. C. (unless from outside the country). Assuming contact flying, these are the best routes from the points of entry to Atlanta, headquarters of the Second Region, to name an arbitrary destination:

From New Orleans: Northward toward Jackson and Memphis, following the railroad which goes around the west end of Lake Pontchartrain until the swamp section is cleared.

Northeastward toward Hattiesburg, Laurel, and Meridian, Miss., follow the railroad around the east end of Lake Pontchartrain, taking the right fork at Slidell.

Eastward toward Gulfport and Mobile, follow the railroad or Highway 90 along coast line. Swamp areas north and northeast of Mobile are quite extensive. Follow the railroads and highways north and northwest, and the railroad running through Bay Minette and Atmore when going east and northeast.

From Jackson, Miss.: Paralleling highways and railroads run from Jackson in several directions, and the average elevation is less than 500 feet.

From Memphis, Tenn.: There are six main systems of paralleling highways and railroads running out of Memphis. Eastward the terrain becomes gradually more rugged toward Nashville, Chattanooga, or Birmingham. In such areas it is difficult to follow highways and railroads, and compass courses can be used for considerable distances after the general heading and drift have been established.

From Nashville, Tenn.: The terrain is hilly but not mountainous. You won't find good straight lines to follow, but there are no especially hazardous sections to be avoided. Use your compass and ground check points.

From Tri-Cities (Bristol, Kingsport, Johnson City, Tenn.): If you enter this region in this area, you already have had some mountain-flying experience, useful in flights toward Knoxville and Chattanooga or across the gap to Asheville, N. C. From Knoxville toward Atlanta, the preferable course is the highway-railroad route running through Maryville, Etowah, Chatsworth, and Cartersville. It would be unwise for novices to plan flights south or southeast from Knoxville.

From Greensboro, N. C.: Any direction, except northwest, is safe for the novice. Greensboro is on a direct route from Washington, D. C., to Mobile and New Orleans, roughly a straight course 1,000 miles long and with few terrain hazards.

From Raleigh, N. C.: East and south from Raleigh, coastal swamp areas will be encountered. Stay near a road or railroad.

There are many other routes, of course, but the SLP is your best bet. For example, an SLP at Atlanta would not recommend courses between northwest toward Chattanooga and northeast toward Spartansburg. The shore line down the east coast of Florida is perfect for the amateur because of swamp areas in Central Florida. Certain power lines are better to follow than highways and railroads.

Other small ranges of mountains are similar in conformation to the Alleghenies, notably the Ozarks. No peaks in this area exceed 2,500 feet elevation, and all the advice already given concerning Allegheny flying should be applied to flying in this area. From the Memphis area to Kansas City the novice is advised to go via Walnut Ridge, Ark., and Springfield, Mo., thus following a valley route with a railroad.

Rocky Mountain Region

The Rockies are not like the Alleghenies. In many respects they are far more strange and awe-inspiring to the average flat-land pilot. They cover more area, they stick up into the clouds farther, and they present a greater variety of terrain than their eastern brothers. Before you tackle any part of the Rockies, read about them here and get advice from the SLP at your point of take-off.

Marshall E. Beeman, Personal Flying Development Assistant in the CAA's Sixth Region at Santa Monica, Calif., has personally done much flying in this area and has done a lot of inquiring for you who are planning to fly to or across the Rockies. He talked to SLP's in the great Southwest by the dozens, and has gathered the fruit of their wide experience.

Here is some of his general advice which will fit most of the mountain areas:

The visual aspects of the mountainous and desert country can be very deceptive. Pilots should maintain 2,000 feet clearance over both mountains and desert at all times. Often, when a pilot is trying to find an 8,000- or 9,000-foot mountain as a landmark, he will miss it because he will be looking for a large mountain when, in reality, it will be little more than a knoll, as the floor of the terrain is 4,000 to 5,000 feet. A compass should be relied upon at all times.

Some sort of treatment for chapped lips, such as camphor ice, is very useful when extreme heat is encountered. Zinc Ointment, or an effective sunburn preventive to rub on face and hands exposed to the sun, will promote comfort. A cap with a generous sun visor and dark glasses are very helpful.

During the winter, freezing temperatures and snow dictate warm clothing and the usual winter precautions. In many of the Rocky Mountain areas, pilots should carry canteens of water on every flight.

Most fields you will use are at higher altitudes than those you have been using back home. This means a longer landing run and longer take-off run. Because of the mountains, there is generally greater air turbulence; wind velocity and turbulence usually increase during the day. Thunderheads build up over mountains during summer afternoons.

Whenever possible, all trips through Rocky Mountain areas should be near a highway, airway, or railroad. We cannot emphasize too much the importance of filing a flight plan and remaining with the plane in the event of a forced landing.

The extreme heat and cold encountered must be considered on all flights. In the summer, flights in this whole area ought to be started as early in the morning hours as practicable. This makes each trip more enjoyable because it avoids the terrific up and down drafts, turbulence, and increasing westerly winds that usually grow as the day progresses.

In Utah, Arizona, Nevada, and parts of California where high altitudes are encountered, light aircraft should not be loaded to their allowable gross weight. Perhaps your plane will not clear a ridge with enough margin for safety.

Never fly up a canyon in order to clear a mountain. Low ceilings, up and down

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TERRAIN FLYING

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drafts, turbulence, and decreased performance are your enemies here, and they are bad. Canyons "dead end," leaving you no space within which to turn.

If your plane will not clear a range with sufficient altitude for safety, go back to the nearest airport and start your trip early the next morning when cool air will improve your plane's performance.

Albert Meyer, CAA Aeronautical Inspector, Albuquerque, offers some valuable general suggestions:

"About the main thing in flying in this country is to have a good airplane and lots of gas to start with," he says. "I would suggest that the pilot with little experience in mountain flying have an airplane that will climb at least 200 feet per minute at 15,000 feet. If he doesn't have such a plane, he should go around the high terrain. In any case, this is the best course. File a flight plan, stay on course, stay with the plane so that search for you is made easier in the event of trouble. In an emergency, land in an uphill direction in any forced landing in the mountains, regardless of wind direction or velocity.

"Don't walk around in mountains at night. Miners have a habit of digging holes and leaving them unguarded."

This matter of thin air at high altitudes is very important to newcomers to mountain flying. All pilots with local experience warn about it. Perry Knowles, of Elko, Nev., doubts whether he can stress the matter of light summer air enough. "Even in landing," he states, "if a person should misjudge and overshoot and then attempt to sideslip, he may find himself in serious trouble if he keeps his side-slip to within 25 to 50 feet of the ground, resulting in no recovery from the sideslip. Most of the boys around here make wheel landings during the summer just for that reason. To have flying speed until after the wheels are on the ground is a mighty nice feeling."

So much for general advice on mountain flying. There are many specific do's and don'ts as well.

The Colorado Aeronautical Commission has conducted a survey on this very question. They print 24 excellent sentences of advice in their little booklet, "Colorado Air Facilities." It also contains a good flying map of the State, and you can get a copy by writing them at Denver. We have covered a few of the Commission's 24 points in the general material above, and we copy the others for your help:

1. The flight should be arranged to avoid topography which would prevent a safe forced landing.

2. Sufficient altitude to permit gliding to a reasonable safe landing area should be maintained at all times.

3. The flight should also be along the populated areas and well-known mountain passes.

4. Sectional charts are much better than regional charts for detail of air pilotage. Study them thoroughly for altitude over route and obvious check points. Prominent peaks make good check points.

5. Believe your compass. Your compass, with proper variations, deviation and wind correction, is the only device you can rely upon to get you out of trouble, but watch for compass irregularities in areas of local magnetic disturbance, usually marked on maps.

6. Don't fly in light aircraft when the winds aloft on your proposed altitude are above 35 miles per hour. Expect winds to be of much greater velocity over mountain passes than reported a few miles distance away from them. This is very important.

7. Know your wind direction at all times, and compare it to water as it flows up, over, and down the mountain ranges. Watch for abrupt changes of wind directions and velocity in mountain areas.

8. Don't fly near or over abrupt changes of terrain, such as cliffs or rugged areas. Very dangerous turbulence may be expected, especially with high winds.

9. Don't fly up the middle of a canyon at any time. It is better to fly along one side or the other so you can execute a 180-degree turn. Also never fly so far up the canyon that a downdraft would let you down to the point where you couldn't turn.

10. Don't get excited if you get in a downdraft. They usually will cease with enough altitude above the ground to maneuver a plane safely away, but do not count on this in extremely turbulent air or in canyon areas.

11. When encountering a downdraft, keep nose down. Maintain sufficient air speed. Don't stall plane and fly out of it immediately with full throttle to area of updraft or smoother air.

12. Realize the actual horizon is near the base of the mountain. The mistake of using the summit of the peaks as the horizon will result in the aircraft being placed in the attitude of constant climb.

13. Approach mountain passes with all the excess altitude possible, as downdrafts of as much as 1,500 to 2,000 feet per minute may be expected on the leeward side. Approaching the passes over a ridge will lessen this a lot. Fifteen hundred to 2,000 feet clearance is preferred on windy days.

14. Expect winds above 10,000 feet to be prevailing westerlies in Colorado.

15. Approach passes and ridges at a 45-degree angle so that you will be able to turn 90 degrees to the low country instead of 180 degrees if you encounter too great a downdraft.

16. Many pilots advise any person first flying into a field at high altitude to make a power approach and a power wheel-landing. This procedure is definitely advisable in gusty air.

Beeman picks out a few routes for you and gives you good SLP advice which he has gathered from many pilots.

Denver to Salt Lake: The direct route is over high terrain with very few service points. Better go by Cheyenne. Remembering the high turbulence and high wind velocity effects, increasing during the day throughout this region, plan this flight, as well as most others described hereafter, for early morning.

Avoid all summer thunderheads in and around Salt Lake Valley in the afternoons. Sometimes these produce hailstorms which can rip the fabric from your wings. During the winter months, smoke from factories in this area reduces visibility considerably, at its worst in the morning hours.

Reno to San Francisco: Follow the airway. It takes 8,000 to 9,000 feet to get over Donner Pass. In summer months, thunderheads will build up over this area during the day, dissipating in the late afternoon. Terrific snowstorms and freezing temperatures and high wind velocity are encountered in winter months.

Salt Lake to Los Angeles, via Las Vegas: There are some mountains along the route which call for the usual care in mountain terrain flying. Stick to the airway between Salt Lake and Las Vegas. Follow Highway 91 west of Las Vegas. If Mint Canyon is closed in, take an alternate route from Victorville through Cajon Pass via San Bernardino. In case of bad weather, landings can be made at Newhall or Palmdale, where transportation is available into Los Angeles.

Winslow, Ariz., to Dagget, Calif., via Needles, Calif.: This route is suggested only for ships with higher horsepower and long range, because of the distances involved, high altitude, winds, thunderstorms, and snow. There is much snow between Winslow and Kingman during winter months. All airports are above 4,000 feet. Gusty and high surface wind conditions usually prevail during afternoon hours. There are usually westerly winds. Pilot should follow Highway 66 and take all the precautions advised for both mountain and desert flying.

El Paso to Phoenix, via Tucson: This route is suggested for the itinerant pilot whose trip would terminate in southern Arizona or California. The ranges are lower, weather conditions better, service points more numerous, and generally good flying conditions prevail during early morning and later afternoons. Take mountain and desert precautions.

Phoenix to Los Angeles, via Blythe,

Calif.: Here the flight had best be made in the early morning. In San Gorgonio Pass (4,100 feet altitude), flanked by Mt. San Jacinto and Mt. San Gorgonio (12,000 feet high), high winds and turbulence can become terrific in the afternoon. These peaks make excellent landmarks, however.

The same conditions prevail as on the Salt Lake-Las Vegas-Los Angeles flight.

Tucson to San Diego.: The suggested route here is via Blythe and Los Angeles, adding only a careful check of coastal weather on the last leg.

San Diego to Oregon State line, via Los Angeles: Pilots will experience ideal flying conditions along the coastal area in both summer and winter. Coastal fogs, prevailing between March and July, usually burn off by 10 a. m. or noon, and there are occasionally high fogs during winter months, suggesting a careful weather check. Crossing the Techapi Mountains can be accomplished most any time during the day and most any time in the year. There are numerous thunderheads over these mountains in the summer and fairly heavy snow in the winter. Ideal flying conditions prevail in the San Joaquin-Sacramento Valley during summer and winter, with a few low fogs in winter.

Wiley R. Wright, the CAA's personal flying man in the Seventh Region at Seattle, knows the northern Rockies, the valleys and passes of the Cascades, the Siskiyous, and the Bitter Roots. Pay heed to Wright if you're flying up there for the first time.

On the western edge of Oregon and Washington there is an irregular, not too high, range of mountains known as the Coast Range, topped to the north on the Olympic Peninsula by the very rugged and sparsely settled Olympic Mountains.

East of the Coast Range from Vancouver, B. C., south along the edge of Puget Sound to Tacoma, Centralia, and Portland is a fairly wide valley known as Western Washington Valley, through which arterial highways and railroads run. South of Portland to a little below Eugene is the Willamette Valley.

East of the valleys mentioned above is the north and south range of mountains, rugged and sparsely settled for most of its distance, known as the Cascade Mountains. This range of mountains has many prominent and high peaks. Starting from the north to south of the Canadian border, Mt. Baker, 10,750 feet, and to the east and southeast of Mt. Baker are many mountain peaks that rise to an elevation above 8,000 feet. One of these, Glacier Peak, has an elevation of 8,145 feet. South of Mt. Baker and Glacier Peak near Seattle is Mt. Rainier, over 14,000 feet, and to the south of Mt. Rainier are Mt. St. Helens and Mt. Adams.

In Oregon, south of the Columbia River, are Mt. Hood, Mt. Jefferson, Three Sister, Mt. Thielsen, Mt. Scott, and Mt. McLaughlin, all of which are above 9000 feet in elevation. Through this Cascade Range of mountains are several passes that are used both by railroad, highway, and flyways.

In northern Idaho and western Montana there are many mountain ranges running generally northwest-southeast that make up the great Rocky Mountain chain, and consist of some rugged terrain and sparsely settled area. Through these chains of mountains there are few passes. In south central Idaho there are some very rugged mountains that branch off the Bitter Root Range and cover a vast area, as well as some desert and lava-bed area.

In southeastern Idaho the mountains are offshoots of more extensive mountains of western Wyoming, which includes the Tetons and Wind River Range in Wyoming and the Wasatch Mountains of Utah.

These mountains make for rather easy navigation, Wright points out. But the weather is strange up there and the ruggedness and sparsely settled areas make it necessary that the pilot be versed in more than just piloting ability. Knowledge of weather is very important.

"There can be several types of weather prevalent in these regions at the same time," he says. "There can be valley or coastal fog west of the Cascades, even rain, and clear weather east of the Cascades, with a still different kind of weather in the mountains of Idaho and Montana. Many times during the summer in the mountainous regions, particularly those of Montana and Idaho, there can be severe turbulence from thunderstorms accompanied often by hail; and it is not always possible to accurately forecast hail. Icing conditions can be found either in summer or winter, and this is of special importance to less experienced pilots in mountain flying."

Wright believes strongly in advance study of your charts; in taking along gas you know will be sufficient to reach your destination or an acceptable and safe alternate; and in getting last-minute local advice.

He lists eight flyways that are usually followed in the Seventh Region:

1. California into Oregon or Washington, via Red Bluff, Calif., into Medford or Klamath Falls, Oreg., depending on whether the destination is to be east or west of the Cascades. The most general route is Medford, Eugene, Portland, Tacoma, Seattle, and Bellingham. Often in winter, bad weather exists just south of the Oregon line over the Siskiyou Mountains and in the Willamette and West Washington Valleys. In most cases, the weather is better east of the Cascades.

2. The route from Klamath Falls to Bend, Redmond, The Dalles, Yakima, and Ellensburg is generally open and flyable. In the summer the temperatures on this route can get quite high. In coming into this route, it is generally advisable to come north between Mt. Lassen and Mt. Shasta, with Shasta and the Cascades on the left. Always check the winds at these high altitudes, especially in the summer.

3. From Salt Lake to Pendleton, via Ogden, Malad City, Burley, Twin Falls, Boise, Baker, and LaGrande is ordinarily a good flying route. You may want to take a lower route; in which case, north from Ogden go via Snowville, Strevell, and Malta. The area in southern Idaho can be very hot in summer, very cold in winter, and produce high winds. Check carefully on the weather over the Blue Mountains.

4. From Ogden through Great Falls to Cut Bank, Mont., is one of the most difficult airways in the United States in the winter. There is more snow at Idaho Falls than at any other airport in the Seventh Region. High altitudes mark this route which is Ogden, Pocatello, Idaho Falls, Dubois, Whitehall, Butte, Helena, Great Falls, and Cut Bank. The airport at Butte is at 5,500 feet, and Monida Pass is 6,000 feet. In hot weather it is possible for winds from 8 to 12 miles an hour to have gusts up to 40 and 50 miles.

5. Sheridan, Billings, Lewiston, and Great Falls is a route with conditions similar to lar to those already described. From Billings to Lewiston the airways go to the east of the Big Snowy Mountain. However, the easiest and lowest elevation would be along a route west of the Big Snowy through Judith Gap and Buffalo. From Lewiston to Great Falls, generally follow the course of the railroad over not too rugged terrain, but at an altitude of about 4,200 feet.

6. From Butte and Helena to the west, go via Deer Lodge, Garrison, Drummond, Superior, St. Regis, Mullan Pass, Kellogg, Coeur d'Alene, and Spokane.

7. Spokane, Ephrata, Ellensburg, Easton, and Seattle is a route over fairly flat country and generally flyable.

8. Between Ellensburg and Seattle there are many occasions when the weather east of the Cascades will be CAVU, with fog boiling over the Cascades and dissipating on their eastern sides. Snoqualmie Pass is on this route, at an altitude of about 3,500 feet, and on many occasions fog from the west makes contact flight impossible. You can get into trouble trying to fly over or under this fog. Many pilots turn south from Ellensburg to Yakima and follow the Columbia River Gorge into

Portland and thence to Seattle. Or, when Snoqualmie is closed, Stevens or Stampede Passes might be used. In Oregon, pilots flying between Eugene and Redmond or Bend use the McKenzie River Pass. These last three named passes are not on the airways, and pilots should approach them and fly through them with care and with sure knowledge of the weather.

Part II of Terrain Flying, October Issue

Air-Conditioned Congress

THE vivid contrast between the record of the 80th Congress and its predecessor, the 79th, where aviation is concerned, should be a matter for real rejoicing to all citizens of the United States.

SKYWAYS castigated the 79th Congress for still living in a horse-and-buggy era, even while the new jets were snarling angry forecasts of things to come over its inattentive heads. We are happy to be able to congratulate the 80th for its awareness of the imperative need for supreme airpower and its translation of that awareness into legislative action and the first adequate appropriation since the end of World War II.

There were good reasons for this new understanding in both House and Senate. The critical financial condition of both the aircraft and air transport industries, the increasing threat of Communist domination of Europe and Asia, the fact that the United States had fallen to third place in the air race among the nations all coalesced into a danger too urgent to be ignored.

"Unification" of the National Military Establishment was discovered to be a grotesque sham, with the services still fighting bitterly among themselves for control. It was a battle costly to the public purse and the national security.

Mid-year of 1947, Congress and the President moved almost simultaneously to establish the two investigating bodies — the President's Air Policy Commission and the Congressional Aviation Policy Board. Their almost complete agreement on the immediate necessity for airpower second to none provided the blueprint which both Congress and the country recognized as an overriding priority.

The President's Commission did its work and went home and no comment has ever been made on it by the White House. The Congressional Board backed its recommendations with some 23 bills and resolutions and pushed them with fervor in the hectic final months of the session. In spite of the pressure of other *must* legislation, many of the most important measures were passed and have become law. If the two reports could have been issued a year earlier, there is little doubt that every one of the Board's measures would have been enacted. Those passed over will now have to be revived by new bills when the 81st Congress convenes in January, 1949, unless events force the calling of a special session. Appropriations for the 70 Group Air Force stand at the head of the list of achievements. It is unfortunate that the legislation authorizing its formal organization failed. The money can be allocated for procurement of the necessary planes but organization of the Air Force itself will be slowed down.

There were three other serious failures. No legislation was passed for the five-year procurement program, nor for the so-called "prototype" bill, which would have authorized the Air Force to plan and procure the design prototypes of advanced cargo and transport planes, to be used on a pay-as-you-go basis by the air carriers. This would have given us the developed transport reserve for emergency military use, at the least cost. It passed the House but failed in the Senate. The third casualty was failure to authorize a permanent Joint Congressional Aviation Policy Committee, admitted to be necessary but opposed by many Members because it would upset the new streamlined committee reorganization of the Congress.

However, the 80th approved domestic air parcel post, the Federal Airport Act, establishment of an Industrial Reserve, outlined powers of the Army and the Air Force to detail students to industrial organizations for study, appropriated funds for Ocean Weather Reporting stations, authorized building of strategic airports in Alaska (but appropriated funds only for Anchorage), authorized helicopter service within 35 miles of main city postoffices and increased membership of the NACA from 15 to 17, gave Federal recognition to the Civil Air Patrol and put regulation of air traffic and training of air traffic control operators in the hands of the Administrator of Civil Aeronautics; saved the GI Flight Training program and persuaded the Air Force to promise overhaul contracts to civilian operators. Reorganization of the CAA and CAB was delayed to give the new Administrator, Delos Rentzel, who had served as an advisor to the Congressional Board, time for a survey of internal problems.

The 80th was the most air-minded Congress in history. It is fervently to be hoped that the 81st will carry forward and extend its work for an implemented national air policy. SKYWAYS feels that the long fight made by the aviation press to this end has done much to bring about recognition of its need by Congress and pledges its continuation of that fight. —J. FRED HENRY